AUCTIONS: MORE SPECTRUM ON THE BLOCK **TECH FOCUS:** WIRELESS SOLUTIONS

America's Network

NOVEMBER 1, 1995 TECHNOLOGY FOR THE NEW PUBLIC NETWORK CAN $5.95 • US $4.95

WIRELESS LOOPS

They're hot overseas, but will they fly in the U.S.?

[redacted]

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OURS

EVERYBODY ELSE'S

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FROM THE EDITORS

THE WEB AND US

I am pleased to report that with this issue, readers of *America's Network* can pull in our new World Wide Web site (http://www.advanstar.com/amnet). We hope that our new Internet presence will provide our readers in the public network community—both service providers and vendors—several layers of information previously impractical or even impossible for us to offer in the print-based (or as MIT Media Labs' Nicholas Negroponte might have it, our atom-based) version of our magazine.

Although our Web site will evolve, we hope to provide you with electronic extensions to the printed page—extensions that will offer deeper information about the technology changes in the public network marketplace. Eventually, we aim to make *America's Network* the front end to a host of useful ancillary information, references and pointers that will lead you to make increasingly smarter business decisions.

Looking a bit further down the road, I envision the printed version of our magazine becoming more and more a program guide to a hyper-referenced database of timely public network resources. Even further down the road, our magazine might look more like a program guide to an electronic conference on public network technology information, choices and opportunities.

To help us along this exciting path, *America's Network* welcomes with this issue our new webmaster, Alyse Rome. Alyse, who can be contacted at webmaster@advanstar.com, comes to us from a California-based software development company where she was responsible for all new media marketing and communications, including the design and implementation of the company's Internet and Web projects. She also helped develop CD-ROMs for computer-based training and is well versed in multimedia content and packaging issues. Please feel free to drop her or me a line with any suggestions you might have on making our magazine more useful to you.

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ADVANSTAR COMMUNICATIONS

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America's Network covers technologies and management of the information industry and public network. It is written for engineers and managers responsible for design, deployment, operation and maintenance of public network elements. Readership includes local and long distance telephone companies, cable TV companies, competitive access providers, wireless operators, computer companies, industry suppliers and consultants.

Publication & Offices: America's Network (ISSN-1075-5292, USPS 576-650) is published the 1st and 15th of every month by Advanstar Communications, Inc. Corporate Offices: 7500 Old Oak Blvd., Cleveland, Ohio 44130. Advertising Offices: 7500 Old Oak Blvd., Cleveland, Ohio 44130 and 312 W. Randolph St. Suite 600, Chicago, Ill. 60606. Accounting, Advertising Production and Circulation Offices: 131 W. First St., Duluth, Minn. 55802.

Subscription Rates: 1 year $44, 2 years $64 (U.S./possessions); 1 year $64, 2 years $114 (Canada & Mexico); all other countries 1 year $84, 2 years $154; for air mail delivery, include an additional $95 per order annually. Single copy prices: U.S., $4.95 each; Canada & Mexico, $5.95 each; elsewhere $7.95 each. All rates include shipping/handling and are payable in U.S. funds drawn on a U.S. bank.

Office of Publication: Advanstar Communications Inc., 131 W. First St., Duluth, Minn. 55802. Second class postage paid at Duluth, Minn. 55806 and additional mailing offices.

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Questions concerning new or existing subscriptions call 218-723-9477 or fax 218-723-9437. Canadian G.S.T. Number R-124213133.
POSTMASTER: Send address changes to America's Network, P.O. Box 6100, Duluth, Minn. 55806. Date: Jan. 28, 1994. Printed in the USA.

Volume 99 Number 21
ISSN-1075-5292 (USPS 576-650)

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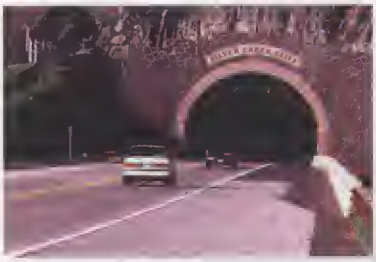

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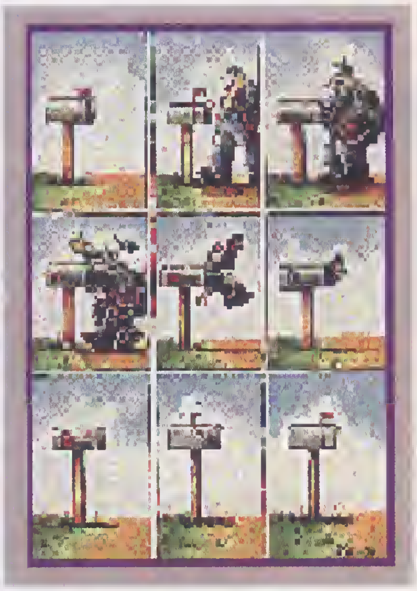

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SMART CONNECTIONS BRING WORLD TOGETHER VIA PC

Andrew Grove
President and CEO, Intel

"Smart connections" mark a fundamental change in the way we are able to communicate in the new digital world. In this new world, more and more people are using their personal computers to create digital content; to transmit it digitally through the existing telecommunications infrastructure; to receive digital information; and to play it back. Smart connections, which are the combination of the intelligent personal computer and the communications infrastructure, advance everything from medical practices to business transactions. They enhance the way we work, play and learn.

Window to The World

Every PC becomes a window through which users can connect to every other computer in the world.

Such pervasive change is possible because of powerful new technologies available at rapidly decreasing costs. Five years ago, a state-of-the-art PC cost $5000. Today, an equivalent system costs roughly $2000, but the microprocessor is much more powerful and the system has many more features. PCs are becoming increasingly easy to use and much simpler to connect to any communications infrastructure including analog and ISDN lines, Ethernet, cable and all forms of wireless connections.

WORLD OF KNOWLEDGE

Tintswalo Community Hospital serves a remote part of rural South Africa. Its primary doctor travels to Johannesburg only once a year. Yet using a PC equipped with personal conferencing technology (a simple add-in board that controls the video and audio data) connected over an ISDN line and microwave link-up, a doctor from Tintswalo can consult a specialist in Johannesburg and diagnose a patient's problem immediately. Thanks to the PC's smart connections, a world of knowledge is now available in Tintswalo.

And businesses are able to use smart connections to improve the timeliness and efficiency of their decisions. Using a high-quality digital line, Japan's Kawashima Textile Manufacturers Ltd. can use a laptop computer equipped with video and document conferencing capabilities to review design changes with the textile designer in Kyoto. The laptop is equipped with a cellular modem that handles video and audio data, as well as conventional text. Imagine holding a meeting like this with an associate in Japan, while you're in the back of a taxicab in Geneva. No matter where you travel, laptops ensure that you can make smart connections.

Finally, individuals benefit from smart connections as much as businesses. Perhaps the most significant phenomenon to occur in the PC and communications industries in the past 10 years is the Internet. Now every PC becomes a window through which users can connect to every other computer in the world.

Consider Clovis Casali, whose home computer is his window to the world. When the French teenager is not playing interactive Monopoly in cyberspace, he "meets" new friends through the home page he created on the Internet. Clovis's PC uses a modem and an ordinary telephone line to connect to the Internet, and through the Internet to his friends in Brazil and England. But their conversation isn't limited to conventional typed messages. Enter Television's real-time voice communications, 3-D software lets them socialize visually as well as verbally. Although scattered all over the globe, these young people can make friendships that transcend geographic distances and national boundaries.

Technology can bring to life a virtual community of people while they are visiting a site on the World Wide Web. This is a smart connection that is right around the corner. Through digital information processed and transmitted between personal computers, people thousands of miles apart can seem to gather in a single room.

By the end of the decade, personal computers will become the most ubiquitous consumer device in the world, surpassing the television in worldwide unit sales. PCs will stand alone as the most versatile and most cost effective way to bring people and information together.

The common thread between the aforementioned smart connections is digital content created, processed, transmitted and played back by personal computers. Extending the digital world follows a great tradition of human endeavor. As the great French aviator, Antoine de Saint-Éxupéry, said in 1939: "Transport of the mails, transport of the human voice, transport of flickering picture—in this century, as in others—our highest accomplishments will have the single aim of bringing men together." ■

Synopsis of Grove's keynote address delivered at Telecom 95, which included live demonstrations of "smart connections" from Africa and Japan.

AT&T breaks up (again)

AT&T

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CORPORATE FOCUS

AT&T's Planned Equipment Spinoff Is Winning Praise

By John J. Keller
Staff Reporter of The Wall Street Jo

NEW YORK – AT&T Corp. is pur its new breakup to focus on its long-distance and cellular services, b hotter prospect may turn out to b vast equipment businesses it is spi off to shareholders.

The new equipment company, operations will produce about $22 bill revenue this year, includes ne switching and transmission gear, sumer telephones, office-phone sy and microchips. Each line is a hot g prospect with healthy profit in its r tive market.

The as-yet-unnamed company al have Bell Laboratories as its pr development engine, giving it mark cachet unmatched in the industry. could make for one of the most succ offerings in years, analysts said, as plans to offer a 15% stake in the equi company to the public sometime earl year, spinning off its remaining inte holders in late 1996.

"It could be very hot," said F

AT&T, REVERSING STRATEGY, ANNOUNCES A PLAN TO SPLIT INTO 3 SEPARATE COMPANIES

THE NEW COMPANIES

Dollar figures represent each new company's approximate share of 1994 revenues.

AT&T
$49 billion
Long-distance service, wireless communications, AT&T Universal credit cards, research and consulting, on-line

COMMUNICATIONS HARDWARE
(not yet named)
$20 billion
Making and selling phones, other communications equipment and computer chips.

GLOBAL INFORMATION SOLUTIONS

New Phone Unit Would Still Be 12th-Largest Company in U.S.

By MARK LANDLER

More than a decade after breaking up the Bell System to settle a Federal antitrust suit, the AT&T Corporation announced yesterday that it would dismantle itself yet again — this time voluntarily.

AT&T unveils 3-ring surprise

Company

AT&T Corp. shocked the corporate world yesterday by announcing it will break itself into pieces for the second time in just over a decade.

would dismantle the $75-billion monolith. It will be replaced by independent companies. A phone pany that will provide long-di

Most Employees of Bell Labs Will Join Equipment Business

New Era Dawns For AT&T—Again

Three spinoffs hope to provide better user focus

Now for the news about the one thing that won't change.

Our commitment to you. Our customers.

There's no shortage of press concerning the restructuring of AT&T. And it's good news for our customers. In 1996, Network Systems will emerge as the heart of a new systems and technology company, better able to serve your needs in an increasingly competitive marketplace.

In the meantime, be assured our focus on you will be stronger than ever.

We won't miss a beat in delivering solutions that meet your specific network demands. Innovative solutions, fueled by the R&D of Bell Labs.

Like our new 5E-10 Software and Long Distance Platform. They allow you to offer the new services customers want on the 5ESS®-2000 Switches you already have.

And after the reorganization?

We'll be a nimbler company, able to respond to you even faster. With the same quality and reliability you know you can expect from us.

And you'll have no reason to doubt our commitment.

Tomorrow is filled with promise for both of us.

We're more ready than ever to work with you today.

AT&T Network Systems

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Circle 104

TECHNOLOGY

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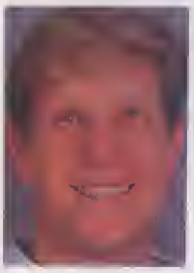

QUESTIONS OF SPACE AND TIME DETERMINE SWITCHING FABRIC

Mark Dziatkiewicz, Technology Editor

Space and time sound more Star Trek than switching, but few concepts play greater roles in communications technology. Separate or combined, space and time division switching perform essential telecommunications functions, forming switching's core fabric.

Space division represents the earliest switching attempt, and one form even predates mechanical means. "For years and years, space division was the main way switching was done," says Amos Joel, an executive switching consultant. "Even with operators, you had cords and plugs."

Operators manually connecting and disconnecting subscribers to and from each other serve as a space switching model. "The most common form of switching was space division, where you set up through the switch a different path for each conversation," he continues. With operators, cords represent "paths" through a virtual human switch.

Other space division switching examples exist. In signal transmission and transport, separate copper pairs and cables delivering telephone signals use space division concepts. "For protection switching from one fiber to another, it's not unusual to use a space division switch," he adds.

Step and electromechanical switches made similar space connections. "It continued even in the early electronic switches," adds Joel. "But as the transmission changed from analog to digital, it was natural to seek solutions that the central office switch fabric itself would be digital. The upshot of this was, as digital came along, we had to find ways to do switching without going back to analog."

The solution incorporated time division, already a common transmission system multiplexing procedure. "In time division, you divide the media into time slots where you put—into each time slot—a different conversation," he explains. "These are known as synchronous time division systems." As time-based systems, time division switching requirements are more stringent, working in microseconds versus space switching's milliseconds.

Time switching involves time-slot changes, with each time slot representing a conversation sample. "The first thing you want to do is move a sample to another time slot. For example, when you take a [sample] out of a time slot, you put it in memory," he continues. There must be sufficient memory for at least every line, according to Joel.

Time slots enter memory in the order in which they arrive, but departure differs. "You take it out in random—it's not FIFO [first in/first out]. You take it out according to the new time slot you want on the new line," he says. A connection established between time slots remains for the call's duration, processing each sample occurrence. "In these time division switch fabrics, these things are occurring 8000 times a second."

COMBINATIONS

Digital switches don't rely on time division alone. Most incorporate both time and space switching stages. "If you have a large number of lines, you need multi-stage networks," he says. While time division moves conversation samples between different time slots, space division moves samples between lines on the same time slot.

"Say something is on channel 5 of one T1 and you want to be able to put it on channel 5 of another line," explains Joel. "To do that, you have to make a movement in space—taking it from one line and putting in on another. When channel 5 comes along, you make a momentary connection to another line on channel 5."

Space and time switching combinations make digital switching efficient. Each performs its specialized function, but how they're combined may depend on application/situation specifics. "The order of space and time is not necessarily set; you could go through either first. There are systems that are time alone and others that are space-space-time-space-space. You can arrange these stages in a number of ways depending on the objectives of the designer. Most have time, then space and then time."

Other network elements—digital cross connects, for example—employ identical time and space division techniques, though their purposes differ. "They're not changing the connection very often; they're up more or less semi-permanent," he adds. "Changes are not made very often except as a central office grows or based on individual customer needs. But technology used is the same—you still have the same need for moving things from one line to another and from one time slot to another."

As switching techniques, time and space division are well established. "The new stuff is ATM, where you start from a different aspect entirely," says Joel. But a trek through time and space switching will "make it so" for generations to come. ■

Telecom Relativity

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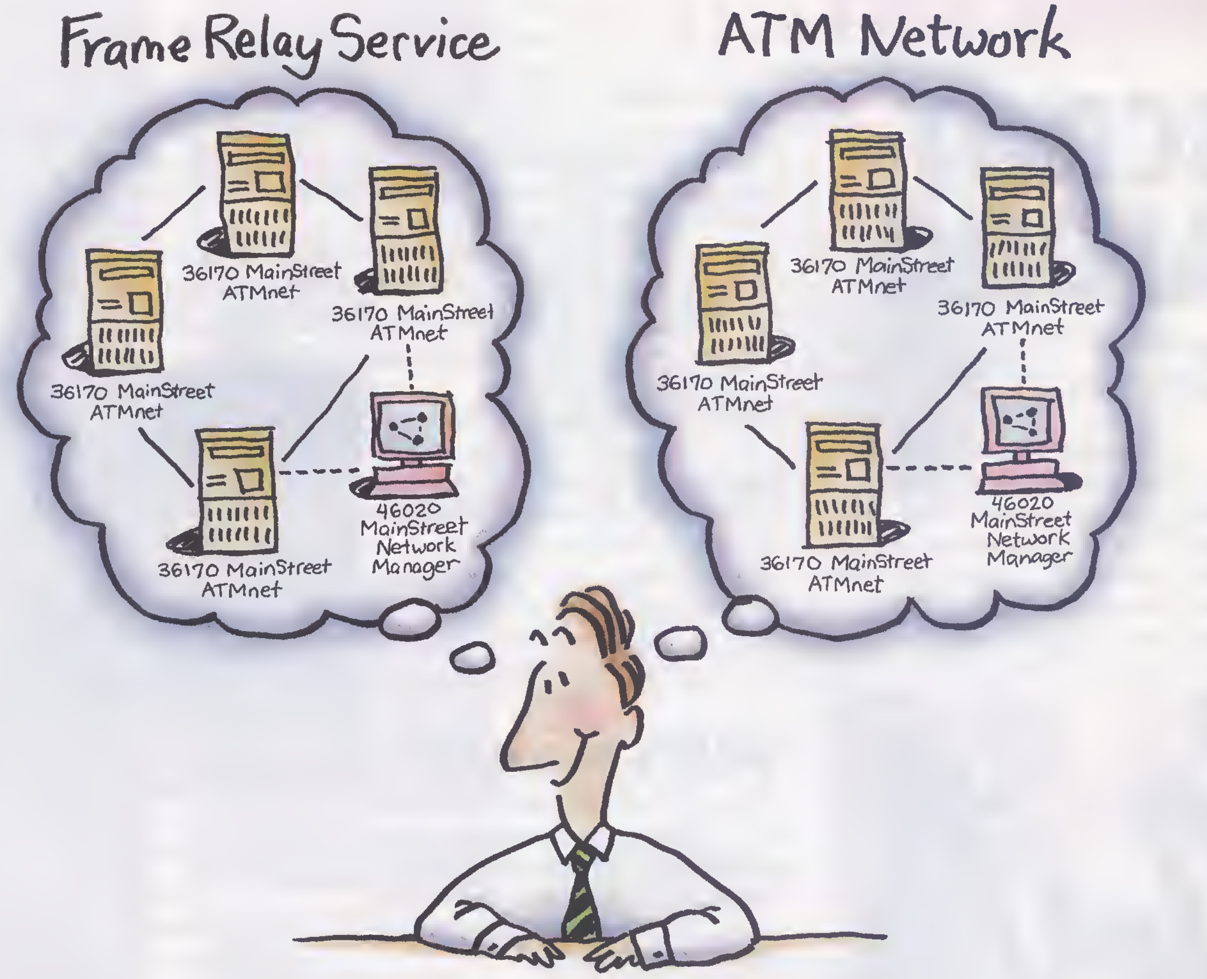

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Circle 126

SCOOT ALONG

Patty Wetli
Associate Editor

Less than 60 shopping days until Christmas and still no idea what to get that special someone? Well, start speed-dialing Neiman Marcus now if you hope to grab one of 15 limited-edition Joe Boxer Cyberscooters.

The rebuilt Vespa Scooter is more than just another toy for the far-too-rich and possibly famous; it's a status symbol for the techno-elite. Not only does the Cyberscooter come complete with yellow happy-face helmet and rally flag, its glove box is stocked with Motorola's MicroTac Elite cellular phone (including digital answering machine and silent call alert) and Envoy wireless communicator with e-mail and fax capability and Internet access.

LOOK MA, NO PANTS - But you'll need both hands—one to steer and one to grip your cellular phone.

Sure the scooter retails for $10,000, but that's a small price to pay considering standard options include a 30-day supply of Joe Boxer underwear plus personal e-mail addresses and Web pages on the company's Internet site (http://www.joeboxer.com).

We'll let Santa worry about cramming the scooter down the chimney.

WHAT'S IN A NAME?

About 6000 vehicles, 45,000 payphones and 5 million phone bills. And that's just in Florida. As Southern Bell and South Central Bell switch over to the BellSouth brand, eradicating evidence of former logos will be no mean feat.

No presto-chango—the transition likely will take months, according to company spokesperson Gaye Walker. In Florida, for example, Southern Bell began morphing into BellSouth in September, and the metamorphosis won't be complete until March or April 1996.

TALK OF THE SHOW

So what drew the hottest buzz at Telecom 95—ATM, HFC, PCS, AT&T unplugged?

Try Alcatel's booth. Standing five stories tall and as long as a city block, it took three months to assemble and used 25km of cabling and 130 workstations. And let's not forget the booth's three bars—just in case visitors worked up a thirst walking the 1350-square-meter floor.

STARSHIP ALCATEL - You couldn't beam aboard, but a handy elevator transported visitors to the "luxury sky-boxes."

Cost estimates ranged from $15 million-$40 million, though the company remained mum about exact cost, with good reason. "This from a company that's losing money all over the place," commented another vendor. ■

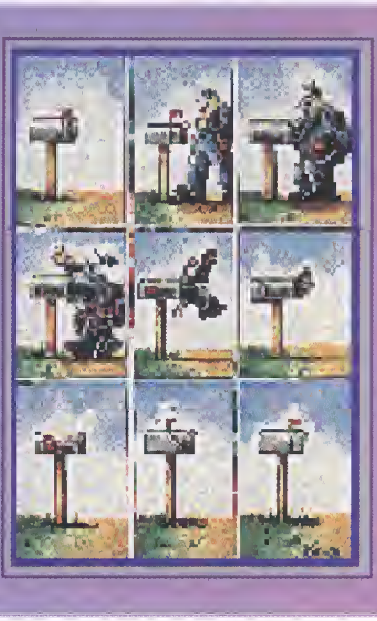
WEB WATCH

WHEN YOU CARE ENOUGH TO SEND THE VERY BEST

But are too lazy to go to the store. A new commercial service allows individuals to create their own pseudo-Hallmark moments without leaving their beloved computer screens. The OutPost Network (http://www.outpost.net) lets Internet users write messages and correspondence on their computers, which then are printed on greeting cards, postcards or stationery, stamped and sent through the U.S. Postal Service.

Browsers can choose from about 100 cards (including the sample at right), according to spokesperson Belinda Young. Some are blank, and others come with pre-printed greetings. "There's room for a salutation and a message up to 60 words," she adds. There's also a signature line, and if you want to add a personal touch to the experience, the OutPost Network will print and stamp the card and mail it to you for your John Hancock.

Why go to such extremes? Young stresses the convenience, particularly for business travelers, who may be on the road when they realize they forgot to send that Valentine's Day card. The company also is selling its connection to the stars—a list of celebrity addresses, which it doesn't share with customers but does use for mailing. Stalkers-to-be take note—all payments to the OutPost Network are made via credit card.



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2 ☐ Bell Atlantic
3 ☐ NYNEX
4 ☐ US West
5 ☐ Southwestern Bell
6 ☐ BellSouth
7 ☐ Pacific Telesis
12 ☐ Bell Communications Research
20 ☐ GTE
30 ☐ Independent Telephone Company

OTHER SERVICE PROVIDERS
Cable TV (CATV) System Operator
50 ☐ MSO (Two or more Cable TV Systems)
55 ☐ Independent Cable TV System
60 ☐ Cable TV Contractor/Engineering Firm
65 ☐ Other Cable
Wireless Operators
190 ☐ Cellular Operator
195 ☐ PCS/PCN Operator
205 ☐ Other Wireless
180 ☐ Long-distance/Interchange Carrier
185 ☐ Competitive Access Provider (CAP)
220 ☐ Telecommunications Reseller
170 ☐ Other Carrier
120 ☐ TELECOMMUNICATIONS CONSULTANT
135 ☐ CONSTRUCTION CONTRACTOR
140 ☐ CONSULTING ENGINEERING FIRM
150 ☐ MANUFACTURER OR DISTRIBUTOR OF TELECOMMUNICATIONS EQUIPMENT
400 ☐ OTHER

2. Which of the following describes your title classification?(check only ONE)
11 ☐ **Technical Management** (Engineering VP, Director or Manager; Technical VP, Director or Manager; Network VP, Director or Manager; Plant Manager)
12 ☐ **Engineering** (Network Designer, Engineer, Technician)
13 ☐ **Management** (VP, General Manager, System Manager, Manager, Director)
3 ☐ **Corporate Management** (Chairman, Owner, President, Partner, Executive/Senior VP/Director, Treasurer, CFO, COO)
4 ☐ **Legal, Financial, Regulatory or Processing Services** (Director or Manager of Rate Planning & Administration, Settlements & Contracts, Service Costs, Methods, EDP or IS Operations)
5 ☐ **Personnel & Administrative Services** (Director or Manager of Training, Safety, Security, Buildings & Land, Purchasing, Supplies & Distribution)
16 ☐ **Sales/Marketing** (Sales or Marketing VP, Director, Manager, Representative)
7 ☐ **Other** (Company copies and Other Titled and Non-titled personnel)

3. PLEASE INDICATE YOUR DEPARTMENT:
1 ☐ Inside Plant/ Network Services
2 ☐ Outside Plant
3 ☐ Engineering/Planning
4 ☐ Administration
5 ☐ Accounting
6 ☐ Sales/Marketing
7 ☐ Customer Service
8 ☐ Other (describe)

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3 ☐ NYNEX
4 ☐ US West
5 ☐ Southwestern Bell
6 ☐ BellSouth
7 ☐ Pacific Telesis
12 ☐ Bell Communications Research
20 ☐ GTE
30 ☐ Independent Telephone Company

OTHER SERVICE PROVIDERS
Cable TV (CATV) System Operator
50 ☐ MSO (Two or more Cable TV Systems)
55 ☐ Independent Cable TV System
60 ☐ Cable TV Contractor/Engineering Firm
65 ☐ Other Cable
Wireless Operators
190 ☐ Cellular Operator
195 ☐ PCS/PCN Operator
205 ☐ Other Wireless
180 ☐ Long-distance/Interchange Carrier
185 ☐ Competitive Access Provider (CAP)
220 ☐ Telecommunications Reseller
170 ☐ Other Carrier
120 ☐ TELECOMMUNICATIONS CONSULTANT
135 ☐ CONSTRUCTION CONTRACTOR
140 ☐ CONSULTING ENGINEERING FIRM
150 ☐ MANUFACTURER OR DISTRIBUTOR OF TELECOMMUNICATIONS EQUIPMENT
400 ☐ OTHER

2. Which of the following describes your title classification?(check only ONE)
11 ☐ **Technical Management** (Engineering VP, Director or Manager; Technical VP, Director or Manager; Network VP, Director or Manager; Plant Manager)
12 ☐ **Engineering** (Network Designer, Engineer, Technician)
13 ☐ **Management** (VP, General Manager, System Manager, Manager, Director)
3 ☐ **Corporate Management** (Chairman, Owner, President, Partner, Executive/Senior VP/Director, Treasurer, CFO, COO)
4 ☐ **Legal, Financial, Regulatory or Processing Services** (Director or Manager of Rate Planning & Administration, Settlements & Contracts, Service Costs, Methods, EDP or IS Operations)
5 ☐ **Personnel & Administrative Services** (Director or Manager of Training, Safety, Security, Buildings & Land, Purchasing, Supplies & Distribution)
16 ☐ **Sales/Marketing** (Sales or Marketing VP, Director, Manager, Representative)
7 ☐ **Other** (Company copies and Other Titled and Non-titled personnel)

3. PLEASE INDICATE YOUR DEPARTMENT:
1 ☐ Inside Plant/ Network Services
2 ☐ Outside Plant
3 ☐ Engineering/Planning
4 ☐ Administration
5 ☐ Accounting
6 ☐ Sales/Marketing
7 ☐ Customer Service
8 ☐ Other (describe)

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SERVICE WILL MAKE THE BIG DIFFERENCE.

Like wireless cable spectrum also on the auction block this month (*see page 18*), the value of SMR bandwidth is diminished by incumbents already operating in the top urban markets. The SMR incumbents in 46 Designated Filing Areas (DFAs) will be protected by strict interference rules.

But like the wireless cable auction, the upcoming 900MHz bidding marks the lifting of a licensing freeze that stymied incumbents' growth. Established SMR players such as PowerSpectrum and RAM Mobile Data have a chance to enlarge their footprints.

"A lot of these companies never could build out a nationwide system," explains

The commission allocated 200 SMR channel pairs in 46 DFAs before imposing the licensing freeze. Although carriers expanded outside their DFAs to meet growing demand for regional service, those licenses were granted on a secondary basis, meaning they were not protected from interference from primary licensees.

The FCC will lift its freeze by auctioning 1020 licenses in 51 Major Trading Areas (MTAs). The commission will auction 20 10-channel licenses in each MTA, with half the channels located in the 935MHz-940MHz band and half in the 896MHz-901MHz band. "We decided to do the MTAs because we thought it would best enable people to provide wider area

Once auction winners secure their spectrum, they'd better check out what competitors charge, advises Rob Hoggarth, director-regulatory affairs for the Personal Communications Industry Association. Innovations such as mobile conference calling will grab customer's attention, but "what really is going to make these businesses successful is their ability to price their services competitively," says Hoggarth.

"If I can get cellular service cheaper than I can get SMR for my plumbing trucks, then heck, I'll go with cellular. If two-way paging is more cost-effective, then I'm going to use that."

Hoggarth concludes that "the price, reliability and availability of the service will make the big difference." ■

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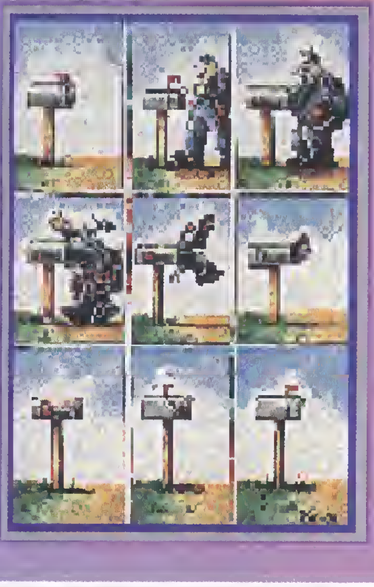
But are too lazy to go to the store. A new commercial service allows individuals to create their own pseudo-Hallmark moments without leaving their beloved computer screens. The OutPost Network (http://www.outpost.net) lets Internet users write messages and correspondence on their computers, which then are printed on greeting cards, postcards or stationery, stamped and sent through the U.S. Postal Service.

Browsers can choose from about 100 cards (including the sample at right), according to spokesperson Belinda Young. Some are blank, and others come with pre-printed greetings. "There's room for a salutation and a message up to 60 words," she adds. There's also a signature line, and if you want to add a personal touch to the experience, the OutPost Network will print and stamp the card and mail it to you for your John Hancock.

Why go to such extremes? Young stresses the convenience, particularly for business travelers, who may be on the road when they realize they forgot to send that Valentine's Day card. The company also is selling its connection to the stars—a list of celebrity addresses, which it doesn't share with customers but does use for mailing. Stalkers-to-be take note—all payments to the OutPost Network are made via credit card.



CARRIERS SHUT OUT OF PCS HAVE ANOTHER SHOT WITH SMR

Deborah Eby
Washington Editor

Markets aren't always captured with a sudden, billion-dollar blitz of costly technology. Sometimes adding value to services customers already find useful is enough to boost revenues and stay afloat in the increasingly competitive wireless market.

The FCC's Nov. 28 auction of 900MHz specialized mobile radio (SMR) spectrum will offer established carriers such a chance to expand and solidify their customer base. Entrepreneurs and rural telcos also will have a chance to elbow their way into wireless without suffering PCS sticker shock.

> **WHAT REALLY IS GOING TO MAKE THESE BUSINESSES SUCCESSFUL IS THEIR ABILITY TO PRICE THEIR SERVICES COMPETITIVELY. THE PRICE, RELIABILITY AND AVAILABILITY OF THE SERVICE WILL MAKE THE BIG DIFFERENCE.**

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"A lot of these companies never could build out a nationwide system," explains Elliot Hamilton, director-U.S. wireless for MTA/EMCI. "It's going to be very hard for someone else to bid against them, so I think most of the markets will be had for a song where there are a lot of incumbents."

On the other hand, in under-served markets, there's room for the little guy. "If you're a rural telco and you don't have any plans to participate in the PCS auctions, this wouldn't be a bad strategy if you did want to get into wireless," says Hamilton.

THAWING THE FREEZE

The FCC created the 900MHz SMR service in 1986 to relieve congestion in the 800MHz band. SMR carriers traditionally serve taxi companies, delivery services and other businesses that must communicate with mobile fleets. Digital technology and other enhancements are making SMR increasingly competitive with cellular, PCS and paging carriers.

The commission allocated 200 SMR channel pairs in 46 DFAs before imposing the licensing freeze. Although carriers expanded outside their DFAs to meet growing demand for regional service, those licenses were granted on a secondary basis, meaning they were not protected from interference from primary licensees.

The FCC will lift its freeze by auctioning 1020 licenses in 51 Major Trading Areas (MTAs). The commission will auction 20 10-channel licenses in each MTA, with half the channels located in the 935MHz-940MHz band and half in the 896MHz-901MHz band. "We decided to do the MTAs because we thought it would best enable people to provide wider area service," explains Diane Law of the FCC's Wireless Bureau.

Incumbent 900MHz SMR licensees are protected from interference within their 40dBu signal strength contour. This protection includes incumbents with secondary licenses outside DFAs issued before Aug. 9, 1994. MTA license winners are required to build out systems that can reach two-thirds of the population within five years.

Special "partitioning" provisions will allow rural telcos to form consortia to bid on MTAs, then divide spectrum among themselves. They also may negotiate with other licensees before or after the auction to buy spectrum only in the telco's service area.

The FCC has created two categories of small businesses—those with revenues of $3 million or less and those that earn $15 million or less—and created bidding credits, reduced down payments and installment plans to encourage participation.

IF THE PRICE IS RIGHT

Once auction winners secure their spectrum, they'd better check out what competitors charge, advises Rob Hoggarth, director-regulatory affairs for the Personal Communications Industry Association. Innovations such as mobile conference calling will grab customer's attention, but "what really is going to make these businesses successful is their ability to price their services competitively," says Hoggarth.

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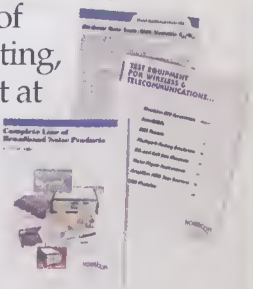
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DIGITAL AD INSERTION SYSTEMS MOVE TOWARD 'PICO-MARKETING'

Vince Vittore
Associate Editor

For several years, the cable industry anxiously has awaited the arrival of digital ad insertion systems. Now that vendors appear ready with them, the systems' ultimate beneficiaries could be telcos setting up large-scale video networks to compete with incumbent cable TV companies.

In their analog format, ad insertion systems consisted of videotapes being flown all over the country, and cable headends relying on signals from ad distributors to determine when and on what channel ads should be run, says John Zarchen, a spokesman for IndeNet, a video programming and advertising distributor. "The history of ad insertion is videotape and tone recognition equipment."

However, with digital systems, taped commercials can be stored on servers and distributed to headends on a regional, local or even neighborhood basis. Eventually, says Scott Kane, director-communications industry for Digital Equipment Corp., advertisers will be able to target specific households and perhaps specific individuals.

DIGITAL AD INSERTION

Within the past year, several vendors, including DEC, IndeNet and Sony, have unveiled digital ad insertion systems. DEC, which developed its system to run off the Mediaplex video server platform, uses a client-server architecture and MPEG-2 compression.

As Kane explains, the process starts with a videotaped commercial that is digitized using MPEG-2 and put onto a master video server. When a spot needs to be run on MTV in Boulder, Colo., for example, the server sends the digital file to cable systems serving the Boulder area. At the headends, a client receives the file and automatically halts national advertising at the appropriate time on MTV to run the spot. "We don't have to call Charlie in Boulder and ask if he really ran the ad. With this system, the process is automatic."

Currently, the company sends files over dedicated pipes but will begin migration to an ATM backbone soon, he adds.

Earlier this year, DEC won the largest ad insertion contract to date with a $9 million deal to provide its system to AdLink, the country's second-largest cable advertising distribution service. AdLink, which distributes advertising to more than 2 million cable TV subscribers in Southern California, has installed DEC's Digital Media Studio at its Los Angeles headquarters and plans to deploy 53 ad insertion systems to its affiliated cable companies in Southern California.

IndeNet revealed its own digital version last month. The system, based on Channelmatic's Adcart system, also uses MPEG-2. However, the company is differentiating it by emphasizing its peer-to-peer architecture. Under this design, spots that run multiple times throughout the day on a single channel can be stored in a buffer assigned to that channel in the headend's playback unit.

"If a spot runs 10 times on CNN, that's its primary location in the playback unit," says Tom Walsh, president of Channelmatic. "This reduces LAN traffic from 50%-90%. With the more LAN/WAN-oriented systems, if a spot runs 10 times on CNN, you have to move that spot 10 times." The company also is playing up its system's reliability, saying that with more traffic, there are more points of potential failure.

Regardless of architecture, one of the enabling technologies behind all the digital systems is RAID (Redundant Array of Inexpensive Disks) storage technology. RAID simply is the least expensive way to store huge numbers of files in a small space, say vendors. Sony, which debuted its system at the National Cable Television Association show this year, is using stacked, 2.1-gigabyte capacity disks that can store more than 500 commercials and simultaneously spit out 12 discrete NTSC video streams. DEC, though, claims the capacity title for the moment with its server that can store "thousands" of commercials and spit them out over 20 channels.

PICO-MARKETING ENTERS PICTURE

The next step for many vendors is to enhance further the target marketing ad insertion already allows by using information culled from addressable set-tops. Instead of simply sending ads to a metro area, for example, they could show advertising only to homes with a history of using interactive video services to purchase items.

That's good news for telcos entering the video services competition with lots of two-way transmission experience. If the process is to work effectively, ad distributors must gather demographic and viewing-habit information sent upstream, a process not unlike analyzing calling patterns.

The process still is in the incubation stage, however, and several technological developments remain. Additionally, advertisers likely will face a host of new issues (privacy, for one) before being able to target very small segments of the buying public.

Still, some are ready to move forward and talk about targeting specific individuals' set-top boxes. Eventually, Kane says, a toy company could target ads to boxes hooked up to TVs in rooms of children under age 15. In its purest sense, it introduces pico-marketing or the ability to target an audience of one. "That's the next step out there. We're moving from a joint TV-watching experience where everyone sits in the same room to a one-on-one experience." ■

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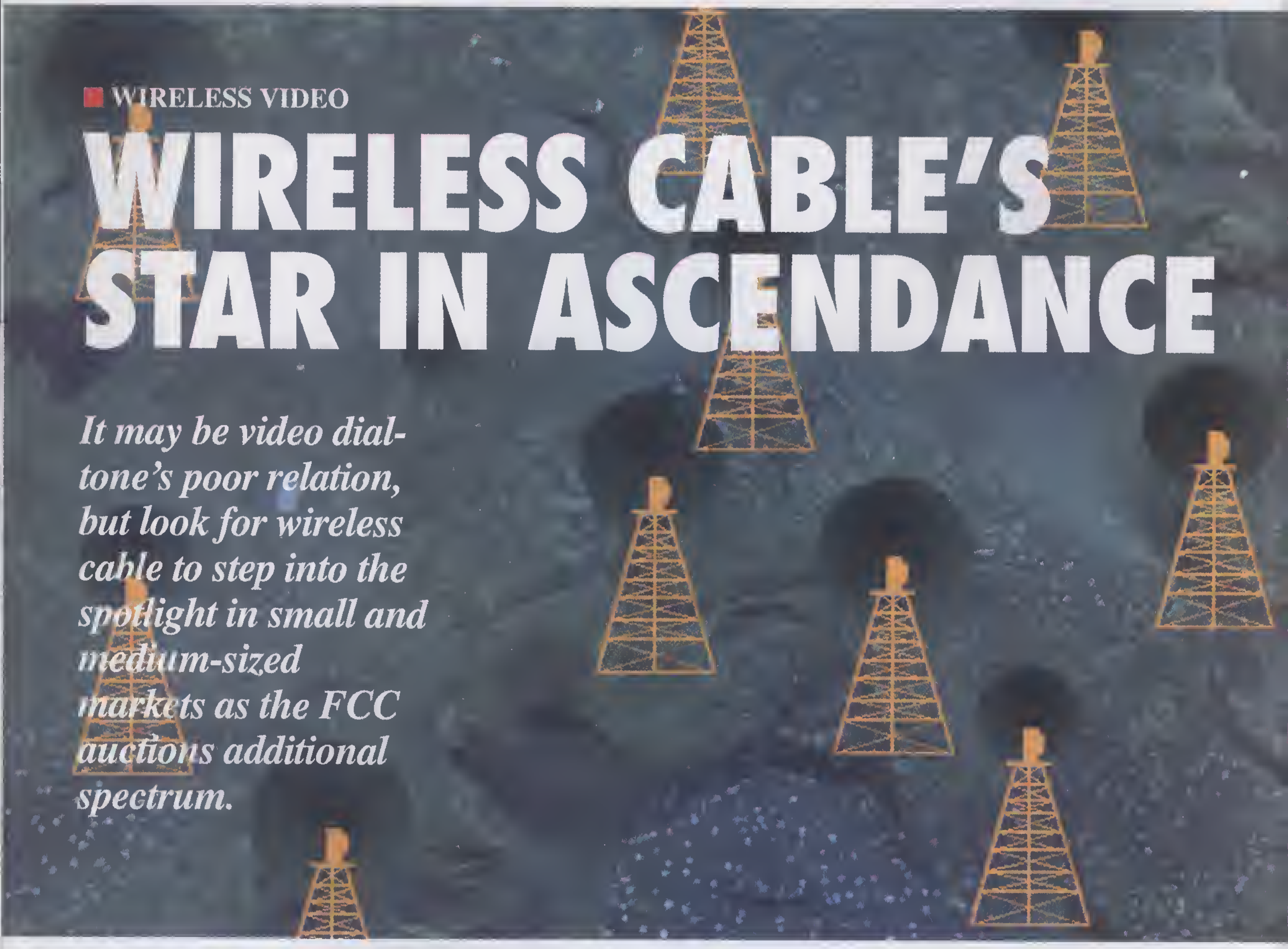

■ WIRELESS VIDEO

WIRELESS CABLE'S STAR IN ASCENDANCE

It may be video dial-tone's poor relation, but look for wireless cable to step into the spotlight in small and medium-sized markets as the FCC auctions additional spectrum.

Deborah Eby
Washington Editor

This month's wireless cable spectrum auction won't generate the publicity or proceeds of the multi-billion-dollar PCS sell-off—the FCC expects to raise a modest $80 million for the Federal Treasury. But auction winners will use their spectrum to expand a relatively small, 15-year-old industry that is ascending to take its place among fierce competitors in the video marketplace.

"We think wireless cable has a future much longer than three or five years. We're talking 15 years," declares Tom McKeever, manager-strategy for Pacific Telesis Enhanced Services. [McKeever spoke with *America's Network* before the FCC's Oct. 10 blackout on discussing auction-related strategies.]

Pacific Telesis recently shifted gears to slow construction of wireline video dialtone (VDT) networks and expand digital wireless cable. This summer, the RBOC acquired cable operator Cross Country Wireless, which serves Los Angeles, Orange County and San Diego.

With communications titans enthusiastic about wireless cable, why isn't the Nov. 28 MDS auction the hottest ticket in town? Because operators already have snatched up most large markets, especially in the East, and are protected by strict interference rules.

"Probably the top 200 markets are gone," estimates Paul Sinderbrand, counsel for the Wireless Cable Association. Newcomers could launch a viable business in medium and small markets, but in urban areas, "it's really table scraps that are being auctioned."

A BRIEF HISTORY OF MDS

The FCC began authorizing use of the 2150MHz-2160MHz band for wireless cable (formally know as Multipoint Distribution Systems or MDS) in the 1970s. Today, 170 wireless cable operations serve 700,000 homes, although that number is poised to burgeon into the millions by yearend.

Each market includes 13 MDS channels, to which licensees may add leased capacity from the adjacent Instructional Television Fixed Service (ITFS) for a total of 33 channels. Operators should be able to triple that capacity (at least) by mid-1996 when digital compression technology is widely available at an affordable price.

The FCC froze MDS authorizations in 1992 when "the backlog of applications reached the tens of thousands, with the

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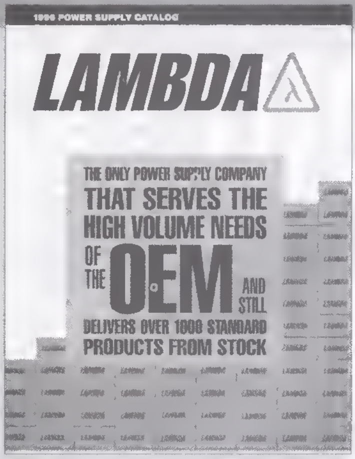

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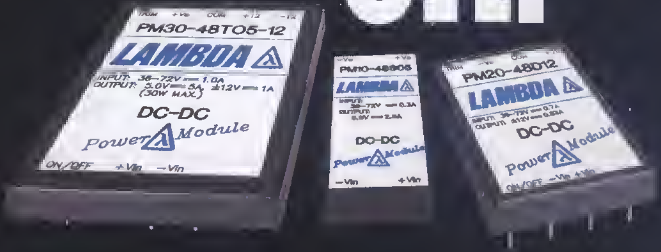

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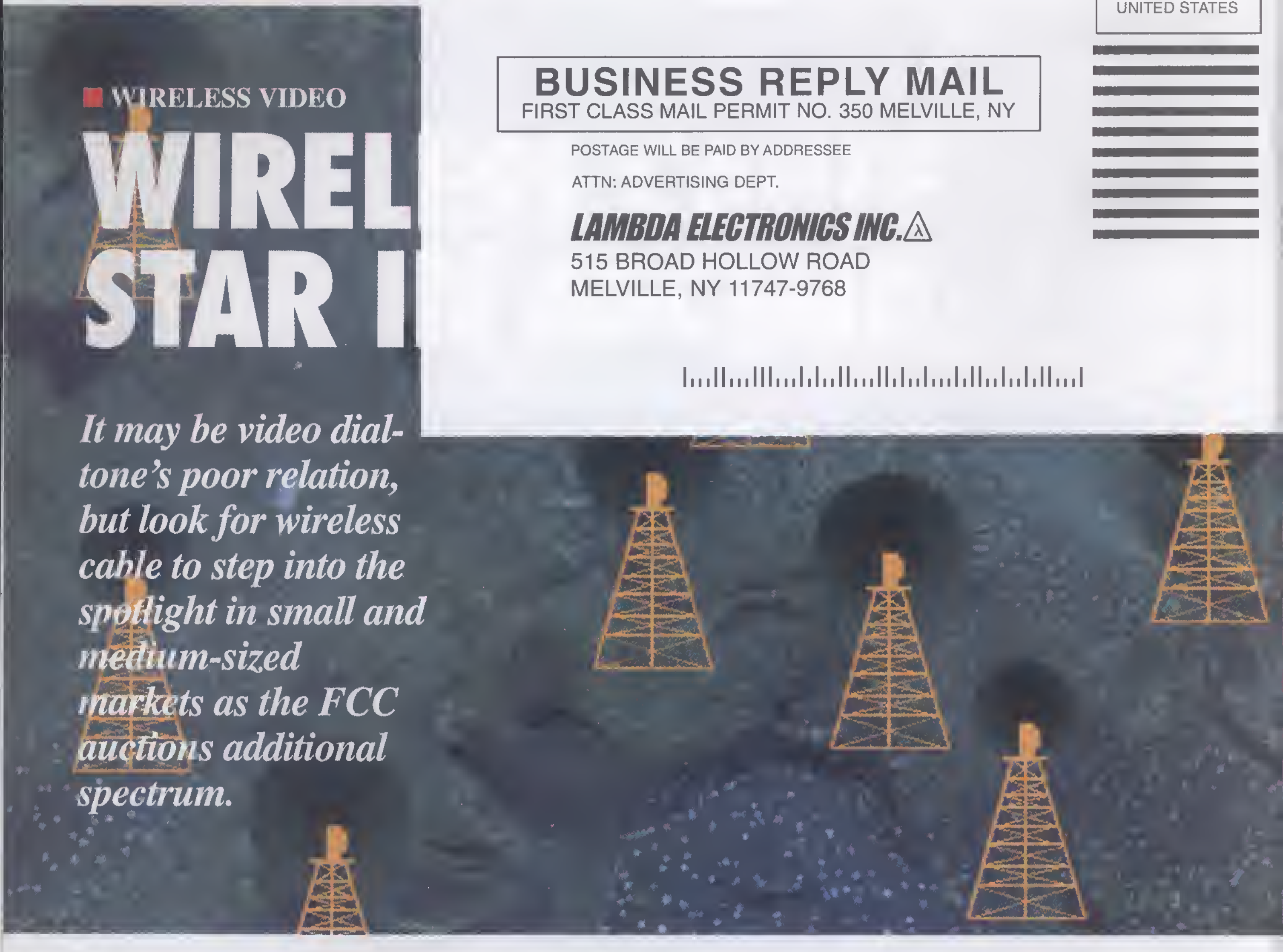

WIRELESS VIDEO

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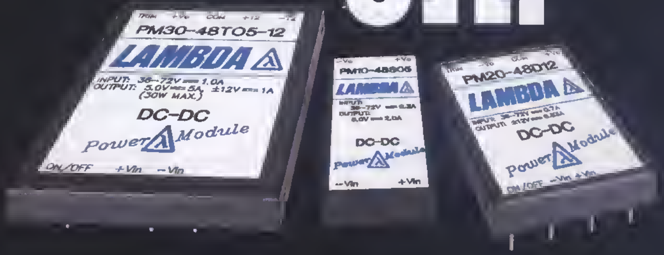
Lower the price,
deliver it quicker,
but keep the
pin-outs the same.

OK.



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PM Series Features

Worldwide Safety Agency Approvals	Safety agency approvals to UL1950, EN60950 and CSA234M90 ensure compliance throughout the world.
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4 Week Delivery	The shortest lead-time in the industry minimizes inventory and provides a significant advantage with today's ever-tightening production cycles.
Broad Product Range	42 single, dual and triple output models in 10W, 20W and 30W packages ensure that your system can be designed using standard converters, minimizing design cycle and production lead time.
12V, 24V or 48V Nominal Inputs	Three input voltage ranges offer solutions for diverse applications.
2:1 Input Range	The wide range inputs allow for input sags and surges, and comply with all the major agency specifications.
Overvoltage Protection	Overvoltage protection is included on all single output models and the main outputs of dual and triple output models, protecting logic circuitry from catastrophic failures.
Level B EMI	48V input models comply with EN55022, FCC Part 15 Level B (with an external low ESR capacitor), facilitating system EMI compliance and minimizing system filtering requirements.
Remote On/Off	20W & 30W models can be controlled remotely for intricate system timing requirements.

PM Series Single Output

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8.40	3.30	2.55	PM10-12S03	PM10-24S03	PM10-48S03	$50	$47	$46
10.00	5.00	2.00	PM10-12S05	PM10-24S05	PM10-48S05	50	47	46
10.00	12.00	0.83	PM10-12S12	PM10-24S12	PM10-48S12	50	47	46
16.50	3.30	5.00	PM20-12S03	PM20-24S03	PM20-48S03	84	83	82
20.00	5.00	4.00	PM20-12S05	PM20-24S05	PM20-48S05	84	83	82
20.00	12.00	1.67	PM20-12S12	PM20-24S12	PM20-48S12	84	83	82
24.75	3.30	7.50	PM30-12S03	PM30-24S03	PM30-48S03	99	97	88
30.00	5.00	6.00	PM30-12S05	PM30-24S05	PM30-48S05	99	97	88
30.00	12.00	2.50	PM30-12S12	PM30-24S12	PM30-48S12	99	97	88

PM Series Dual Output

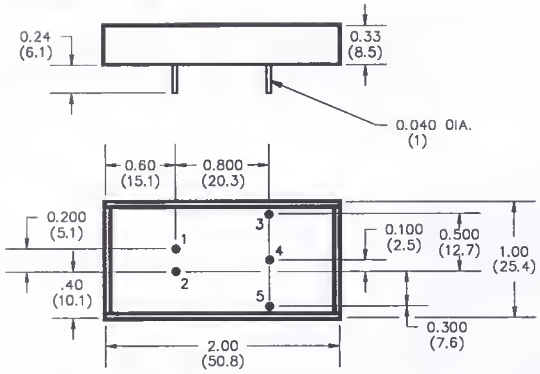
OUTPUT POWER (W)	OUTPUT VOLTAGE (V)	MAX CURRENT*	12V INPUT	MODEL 24V INPUT	48V INPUT	UNIT PRICE PER DELIVERED QUANTITY 1	10	100
10.00	±12	0.42	PM10-12D12	PM10-24D12	PM10-48D12	$51	$48	$47
20.00	±12	0.83	PM20-12D12	PM20-24D12	PM20-48D12	87	86	83
30.00	±12	1.25	PM30-12D12	PM30-24D12	PM30-48D12	100	98	95

PM Series Triple Output

OUTPUT POWER (W)	OUTPUT VOLTAGE (V)	MAX CURRENT*	12V INPUT	MODEL 24V INPUT	48V INPUT	UNIT PRICE PER DELIVERED QUANTITY 1	10	100
30.00	3.3 ±12	7.00 1.00	PM30-12T03-12	PM30-24T03-12	PM30-48T03-12	$105	$104	$101
30.00	5.0 ±12	5.00 1.00	PM30-12T05-12	PM30-24T05-12	PM30-48T05-12	105	104	101

*Note: See Specifications on page 7 (Operating Temperature Range Section).

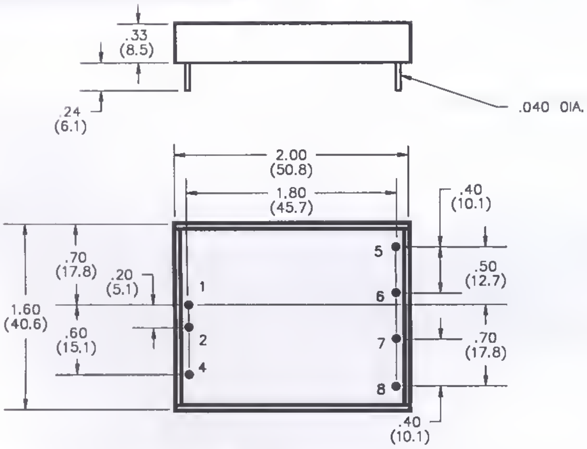
PM10 Series Outline Drawings



PIN NO.	CONNECTIONS	
	FUNCTION	
	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vo	+Vo
4		COMMON
5	-Vo	-Vo

Note: Dimensions are in inches except dimensions in ( ) are in mm. Net weight is 1.0 oz.

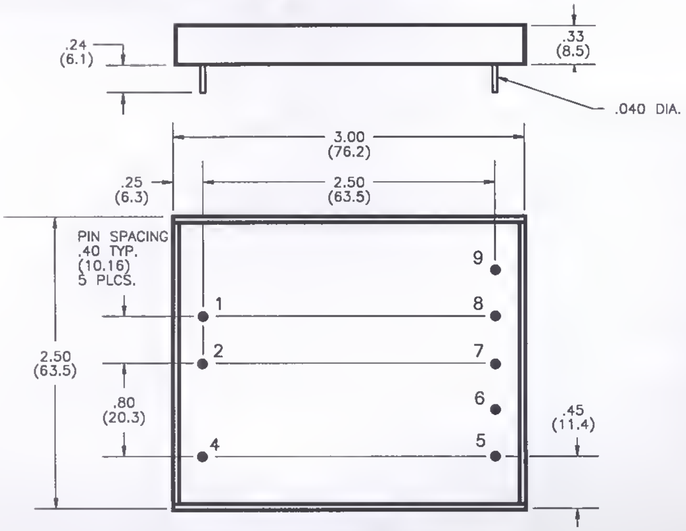
PM20 Series Outline Drawings



PIN NO.	CONNECTIONS	
	FUNCTION	
	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
3		
4	ON/OFF	ON/OFF
5		+Vo
6	+Vo	COMMON
7	-Vo	-Vo
8	TRIM	TRIM

Note: Dimensions are in inches except dimensions in ( ) are in mm. Net weight is 1.5 oz.

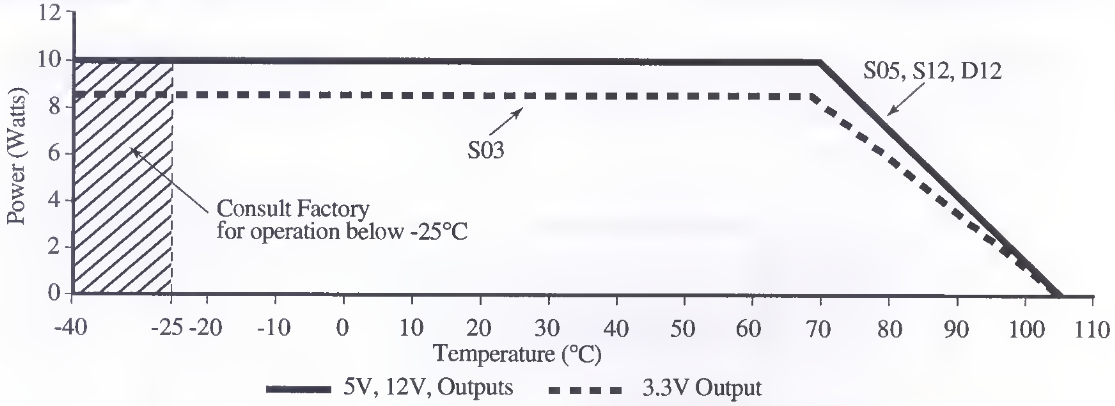
PM30 Series Outline Drawings



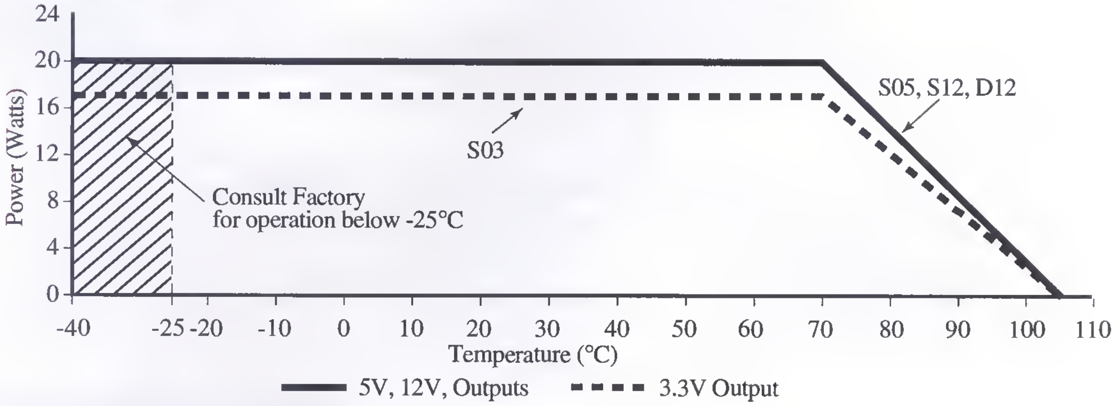
PIN NO.	CONNECTIONS		
	FUNCTION		
	SINGLE	DUAL	TRIPLE
1	-Vin	-Vin	-Vin
2	+Vin	+Vin	+Vin
3			
4	ON/OFF	ON/OFF	ON/OFF
5	TRIM	TRIM	TRIM
6	+Vo	+Vo	+5/+3.3
7	-Vo	COMMON	COMMON
8			+12
9		-Vo	-12

Note: Dimensions are in inches except dimensions in ( ) are in mm. Net weight is 2.5 oz.

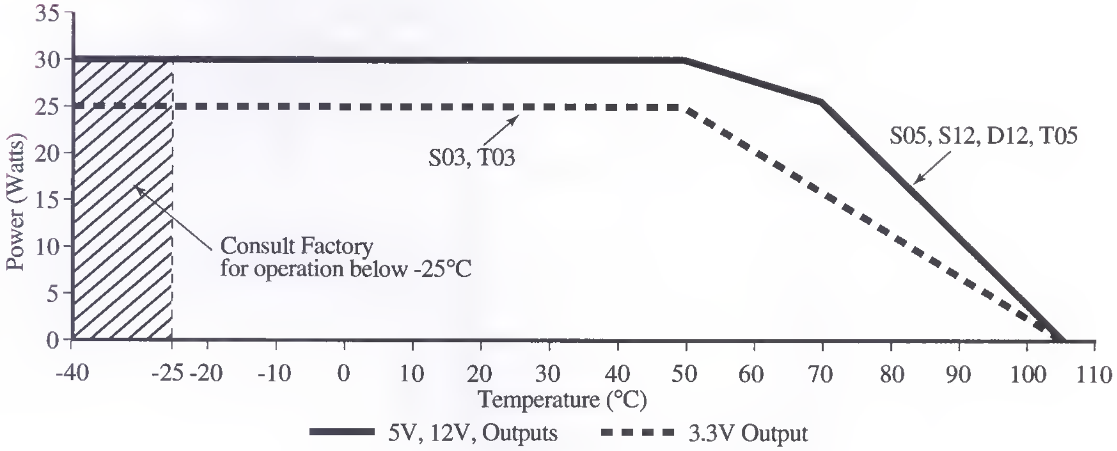
PM10 Derating Curves



PM20 Derating Curves



PM30 Derating Curves



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PM Series Specifications

DC Input
9-18VDC nominal on 12V models.
18-36VDC nominal on 24V models.
36-75VDC nominal on 48V models.

Efficiency
12 Vin Models

	SINGLES			DUALS	TRIPLES	
	3.3	5.0	12	±12	3.3, ±12	5.0, ±12
PM10	73%	75%	75%	77%	—	—
PM20	73%	78%	78%	79%	—	—
PM30	72%	74%	75%	75%	75%	75%

24 Vin and 48 Vin Models

	SINGLES			DUALS	TRIPLES	
	3.3	5.0	12	±12	3.3, ±12	5.0, ±12
PM10	76%	78%	78%	80%	—	—
PM20	76%	81%	81%	82%	—	—
PM30	76%	80%	80%	80%	78%	80%

Output Voltage Accuracy
Single output accuracy is ±1%. Dual output accuracy is ±1.5%. Consult the factory for triple output accuracy.

Regulated Voltage
Regulated values pertain to operation with output currents above 10% of rated load current on the main output and above 25% of rated output on the auxiliary outputs.

Line regulation........0.2% for changes over the entire input range on single and dual output PM10, PM20 and PM30 models, and on main output of triple output PM30 models. 3.0% (typical) on auxiliary outputs of triple output PM30 models.

Load regulation.....1.0% (typical) for changes between 10% and 100% of full load, on single output PM10, PM20 and PM30 models, and on main output of triple output PM30 models. 8.0% (typical) for output changes between 25% and 100% of full load (main output set at >5W) on auxiliary outputs of triple output models.

Cross Regulation..3.0% (typical) change in negative output voltage for current changes from 25% to 100% of full load on dual output PM10, PM20 and PM30 models. 8.0% (typical) change in both positive and negative output voltage on auxiliary outputs of triple output models, for a current change from 25% to 100% of maximum rated output current on the main output (auxiliary outputs operating at a minimum load greater than 0.5W).

Ripple and Noise..Measured in mV (pk-pk)

	3.3V	5V	12V	±12V
Single (PM10, 20, 30)	75	75	100	—
Dual (PM10, 20, 30)	—	—	—	100
Triple (PM30)	75	75	—	120

Temperature Coefficient. . . . . . ±0.015%/°C typical on single and dual outputs of PM10 and dual outputs of PM20 and PM30. ±0.01%/°C typical on single output of PM20 and single and main of triple output of PM30. ±0.03%/°C typical on aux of triple output on PM30.

Remote Voltage Programming
The main outputs on the PM20 and PM30 models can be remotely programmed from an external voltage source by using the trim pin. (See Application Notes).

Remote Resistance Programming
The main output of the PM20 and PM30 models can be remotely programmed by using an external resistance connected to the trim pin and referenced to either +V or -V terminal. (±10% adjustment capability).

Overvoltage Protection
Overvoltage protection clamps the output to a predetermined level.

Vo (Nom)	OV Range
3.3V	4.0-4.7V
5.0V	6.2-6.5V
12.0V	13-14.0V
±12V	28-30V

Overcurrent Protection
All units are capable of sustaining short circuit indefinitely on single output models, and on main output of multiple output models. Auxiliary outputs will sustain a short circuit for a minimum of 30 seconds without damage.

Remote On/Off
Remote on/off pin on PM20 and PM30, referenced to negative input terminal, logic level one or open circuit, enables operation of converter, logic zero or short to turn-off.

Transient Response
Output within 2.0% of preset value when a 25% of full load current stop is applied. Recovery to within 1.0% in less than 1 millisecond after transient is applied.

Parallel/Series Operation
Single output DC converters of similar output voltage and current ratings will operate in series and in parallel, with or without isolating diodes.

Operating Temperature Range
-25°C to +70°C on PM10 (+60°C on PM20, and +50°C on PM30). Derate linearly to 0W at 105°C ambient. Operation to +70°C ambient on PM20 and PM30 with externally supplied forced air cooling. Consult the factory for -40°C operation.

Storage Temperature Range
-40°C to +105°C.

Cooling
All models are convection cooled.

Isolation Range
Input to Output:	900VAC, 1500VDC on 48V models. 500VAC, 700VDC on 12V and 24V models.
Isolation Resistance:	$10^6\Omega$ minimum.

Inrush Current
All models meet the ETSI-300-132 requirements for inrush current less than 50A pk.

Input Line Disturbances
All models meet IEEE-C62.41-1980 (0-.5ms, 100KHZ Ring Wave, 2500 Volts Peak). 12V input models meet 25V for 100ms. 24V input models meet 50V for 100ms. 48V input models meet 100V for 100ms and ETSI Standard ETS 300 132 (100V, 10 joules pulse).

EMI
All 24/48 V input models meet EN55022 (Level B), FCC Part 15 (Level B), ANSI 63.12-1987 (as called out in Bellcore TA-NWT-001089 Issue 2). The PM10/PM20 require a low ESR capacitor with a 3.3 mH chip inductor. The PM30 requires a low ESR capacitor across the input terminals of the module.

Safety Agency Approvals
The PM Series is UL1950 recognized, CSA22.2-234 certified and EN60950 approved. Consult the factory for BABT approval.

Package Data
Package Model	Weight (Grams)	Dimensions (Inches)
PM10	28	1.0 x 2.0 x 0.335
PM20	43	1.6 x 2.0 x 0.335
PM30	71	2.5 x 3.0 x 0.335

Guarantee
Two year guarantee applies to operation within published specifications and recommended application data at the end of two years.

Look familiar?

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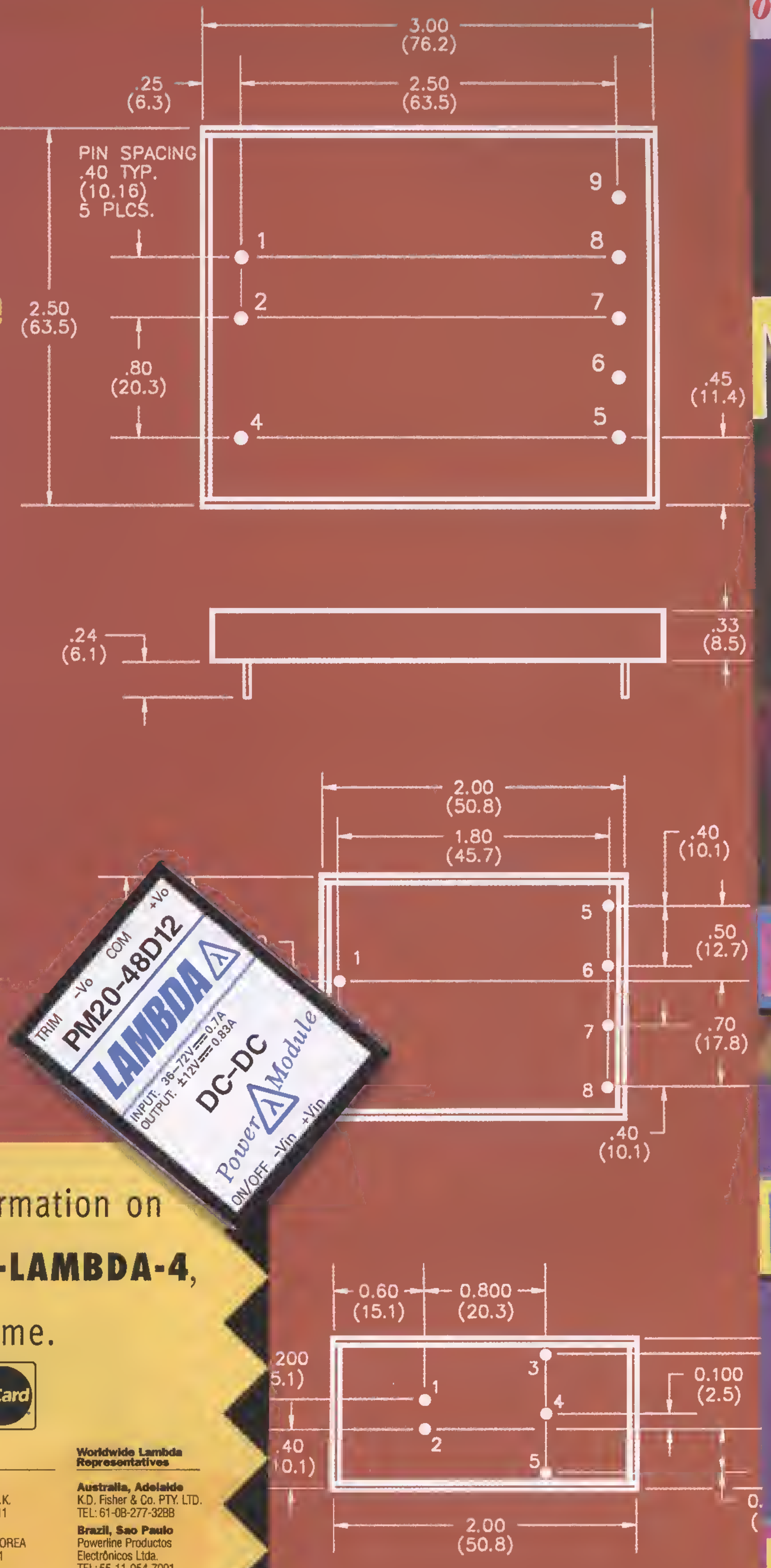

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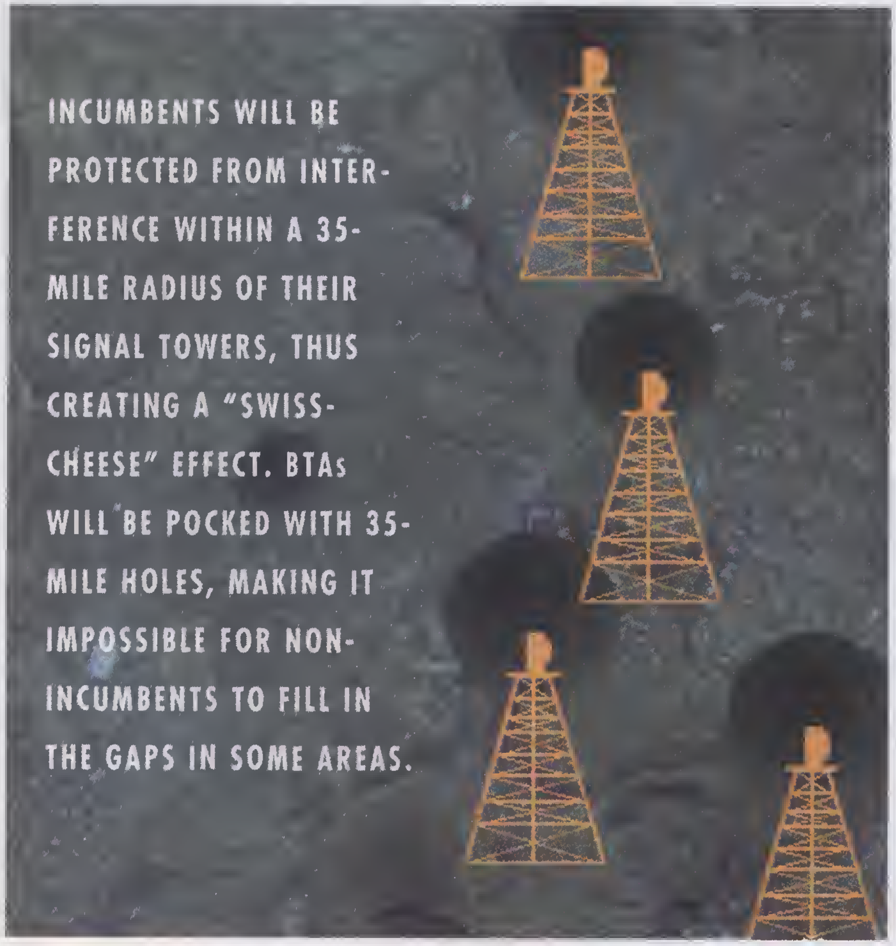
(AN)

WIRELESS CABLE

continued from page ***18***

majority believed to be speculative," according to Sharon Burdleson of the Wireless Bureau. Since then, operators anxious to expand their markets "have been pressuring us to lift the freeze and let them have the spectrum." When Congress authorized spectrum auctions in 1993, it provided the FCC an efficient way to clear the backlog.



INCUMBENTS WILL BE PROTECTED FROM INTERFERENCE WITHIN A 35-MILE RADIUS OF THEIR SIGNAL TOWERS, THUS CREATING A "SWISS-CHEESE" EFFECT. BTAs WILL BE POCKED WITH 35-MILE HOLES, MAKING IT IMPOSSIBLE FOR NON-INCUMBENTS TO FILL IN THE GAPS IN SOME AREAS.

The commission will auction one MDS service authorization in each of 493 Basic Trading Areas (BTAs). To discourage speculators, rules require BTA licensees to build out a system that can reach two-thirds of the population within five years.

Incumbents within a BTA will be protected from interference within a 35-mile radius of their signal towers. Burdleson describes densely-populated BTAs as Swiss-cheese blocks pocked with 35-mile holes where incumbents operate. "There may literally be BTAs where it would be impossible for someone to design a system to fill in the spaces" unless the licensee is the incumbent.

The Swiss-cheese factor means few markets will see significant competition among deep-pocketed bidders, says Sinderbrand. "The incumbent is going to go in and say, 'If I can pick it up cheap, I'm going to pick it up because it would be nice to have.'"

Although the FCC will consider waiver requests to use the spectrum for services other than MDS, Sinderbrand warns against bidders betting on such a waiver. "It's right next to the PCS spectrum. It would not be a major stretch for somebody to figure out how to use this spectrum for PCS. But that's really speculating on rule changes that may or may not happen. The FCC has a strong commitment to wireless cable."

GOOD THINGS IN SMALL PACKAGES

Pac Tel's McKeever doesn't dismiss the medium and small wireless cable markets. "I think that is where you're going to see most of the activity in this auction because that's where the real opportunity is. There are profitable operations out there that serve a thousand subscribers in areas where they're not passed by cable or in smaller communities."

He also points to companies like Heartland Wireless Communications, which built a thriving business by serving small MDS markets scattered throughout the Southwest and Midwest. McKeever hasn't closed the door to snapping up more wireless cable operators to serve markets where VDT isn't cost-justified.

"We always keep all investment alternatives in play," agrees Jeffrey Ward, Nynex vice president for federal policy. "The infrastructure is not in place today for a broad use of MDS in a way that is directly competitive with cable, but it quickly will be in place."

RBOC VENTURES

The RBOC has invested with Bell Atlantic in MDS operator CAI Wireless. Nynex, Bell Atlantic and Pac Tel also have launched the joint venture Tele-TV to tackle the video entertainment market. If anyone doubts these RBOCs are serious about MDS, check out Tele-TV's recent billion-dollar order placed with Thomson Consumer Electronics for 3 million wireless cable set-top boxes.

"The medium in this case is not the message," says Ward. "We don't think our customers really care whether it's coax, fiber optic or wireless. They care about the services they're receiving.

"Bluntly speaking, it comes down to money," he concludes. "It costs a bucketload of money to wire up to deliver video services. It costs a lot of money but not nearly as much to do it using wireless technology, and it does not take nearly as long."

So while the MDS auction may not pay off the national debt, it will provide another weapon in the strategic arsenals of some powerful players. "This is a very serious move for us," says McKeever. "VDT networks are not being laid down everywhere. In some of these markets, I believe that wireless cable is going to be the real competitor to the current embedded cable operators." ■

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INFORMATION INFRASTRUCTURE

NYNEX INVESTS IN WALL STREET

Financial and banking customers push RBOC toward integrated computing platform.

Patty Wetli
Associate Editor

Pushed in part by customers in the banking and financial industries, Nynex suddenly has developed a vision for business services.

Last month, the company announced plans to develop with IBM an integrated and transparent network computing platform to provide value-added services targeted at the business market. Or "internetworked, interactive knowledge tools," in the words of Richard Jalkut, president and group executive, Nynex Telecommunications. "We're using their core strength on computing and our core strength on transport," adds Joe Lucatorto, vice president-product development for Business Network Solutions.

"This is not a product. It's a vision, an architecture," the company emphasizes. Dubbed "Impower," the concept represents Nynex's stake in the ground, its "future strategic initiative," and encompasses a Business Network Architecture (BNA) based on ATM.

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The broadband ATM computing platform will integrate communications and computers in response to an increasingly networked, digital world, according to Ward MacKenzie, Nynex vice president, Business Network Solutions. Customers want access to applications on demand, which the RBOC and IBM intend to supply. "We will give employees access to extensive menu databases and applications just by plugging into the wall," says Steve Mucchetti, IBM's general manager-Telecommunications and Media Industry Solution Unit. The BNA will offer one-stop shopping for voice, video and data needs, all on an ATM backbone.

He points to the Internet as a model for open, heterogeneous networking, but notes that it lacks security and predictability. "We will provide that."

The biggest benefit will be connectivity, explains Lucatorto. Rather than relying on dial-up or private lines to connect LANs, companies will find that capability in the network. "Take voice mail," he says. "There's no way to transfer voice mail between firms." But the BNA will enable that application. It also will transform wide area networking, much of which is "relatively antiquated," according to Lucatorto. TCP/IP will operate like a public server, allowing corporations to "connect their LANs to the public network."

DESKTOP TO DESKTOP

As communications evolves into a desktop-to-desktop proposition, "information utilities" such as Nynex must link PCs to servers and make the connection easy and transparent to customers. They'll also make internetworking less expensive, allowing customers to enjoy the shared "economies and scale of the telephone company" rather than setting up these configurations on their own.

"They can stick to their core business," says Lucatorto.

Impower also will provide bundled services and network management. Indeed, Nynex points to end-to-end service management and a unique collection of services as Impower's major differentiators. "We are bringing to our customers a scale and a scope no one else is bringing," including global partnerships with foreign PTTs, claims Jalkut. "Your PC can get anyplace in the world," and Nynex intends to provide connections not just from Wall Street to 57th Street but to Frankfort or Lima, Peru. "We really see our objective to offer open access across the country and around the globe."

It will do so via local, not long distance, service. If a call originates in London, for example, the local telephone company will hand off to a company's long distance provider of choice, which will carry the call to a POP in the U.S. and then pass the transmission on to Nynex, which will

continued on page ***38***

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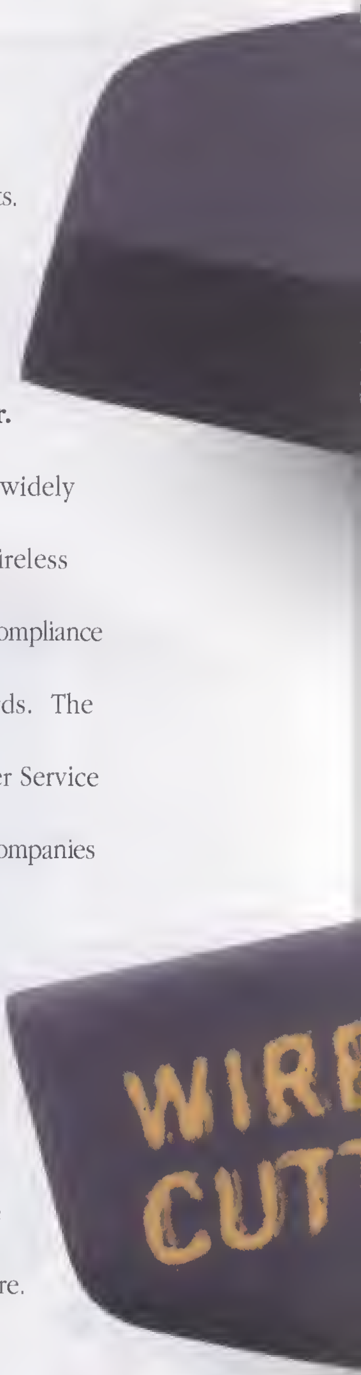

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CLOSURE

NYNEX

*continued from page **34***

"massage the bits and bytes for customers." Barring changes in the MFJ, the RBOC won't be providing the long distance link. (The company is negotiating with 24 local telephone companies overseas to "achieve seamless global connectivity.")

Underlying the rhetoric are six planned product lines: internetwork management, collaborative services, Internet tool kit, applications solutions, virtual access and business integrations services (*see graphic, page 34*). Alpha tests will begin first quarter 1996, beta tests in the second quarter, and services should be ready to roll in New York by July 1. "We always start in one place—Manhattan—then we do Boston," says Lucatorto.

Though consumer services will be announced late next year, Nynex is focusing initial applications on the finance and banking marketplace. "They're an excellent testbed," says Lucatorto. As intense users of telecommunications technology, they are the toughest set of customers to satisfy. "They demand that we stay on the leading edge if not the bleeding edge," says Jalkut. Lucatorto admits if he were in Arkansas, he might not have the same incentive to implement a program like Impower.

Or to deploy ATM. The RBOC will extend ATM to the customer premises via an alliance with Newbridge, although Lucatorto says he could roll out the BNA with existing infrastructure. "ATM as a transport technology is a more efficient way to transport very high volumes of traffic," he says. So Nynex will begin introducing ATM into the network in December, but frame relay will suffice while volumes remain low during initial service demand.

Frame relay also will play a key role in Nynex/Bell Atlantic Frame Relay Corridor Service, which will provide high-speed data links between New York City and northern New Jersey. And the RBOC is working with Pac Bell to develop frame relay, ATM, video conferencing and multimedia messaging. Meanwhile, the company admits "our work is cut out for us." ■

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■ VIDEO PROGRAMMING

IT'S BEGINNING TO LOOK A LOT LIKE CABLE

Patty Wetli
Associate Editor

We have seen the future, and it looks an awful lot like cable TV. If recent telco video trials are any indication, the Information Superhighway or even an infotainment bypass will continue to strand motorists who want more than their MTV.

U S West recently took its video offering to the Omaha masses, distinguishing its analog service from competitors' mainly in pricing and packaging (*America's Network*, Oct. 1). Now Pacific Telesis has announced a preview of programming on its HFC video dialtone network: about 50 analog broadcast channels.

The RBOC is conducting a limited trial with a "very small number of customers" in San Jose, according to Laura Murdock, vice president-marketing for Pacific Telesis Video Services. "It's primarily a technology test," particularly of operating systems and business processes, she emphasizes.

But trial participants are receiving video packaged by the telco's two lead programmers thus far—Anchor Pacific and California Standard Television. The former has put together 28 channels of satellite services (e.g., CNN, ESPN, the Weather Channel) and the latter is taking care of broadcast TV (e.g., the Big Three networks, Fox).

"California Standard and Anchor Pacific are two programmers among what will be quite a few," says Ron Dorchester, president of Anchor Pacific. "Ultimately, we hope to have a very competitive offering."

HOPING FOR THE BEST

That's about all Pacific Telesis can do—hope—where its video dialtone network is concerned. Under terms set forth by the FCC, Pac Tel isn't authorized to select, price or package its own programming. "Our corporation is not in the content creation business," says Murdock. Rather, the RBOC is responsible for getting the "server to set-top [connection] to work." But when it comes to what rides on that connection, the telco must rely on building relationships with media companies such as Anchor Pacific.

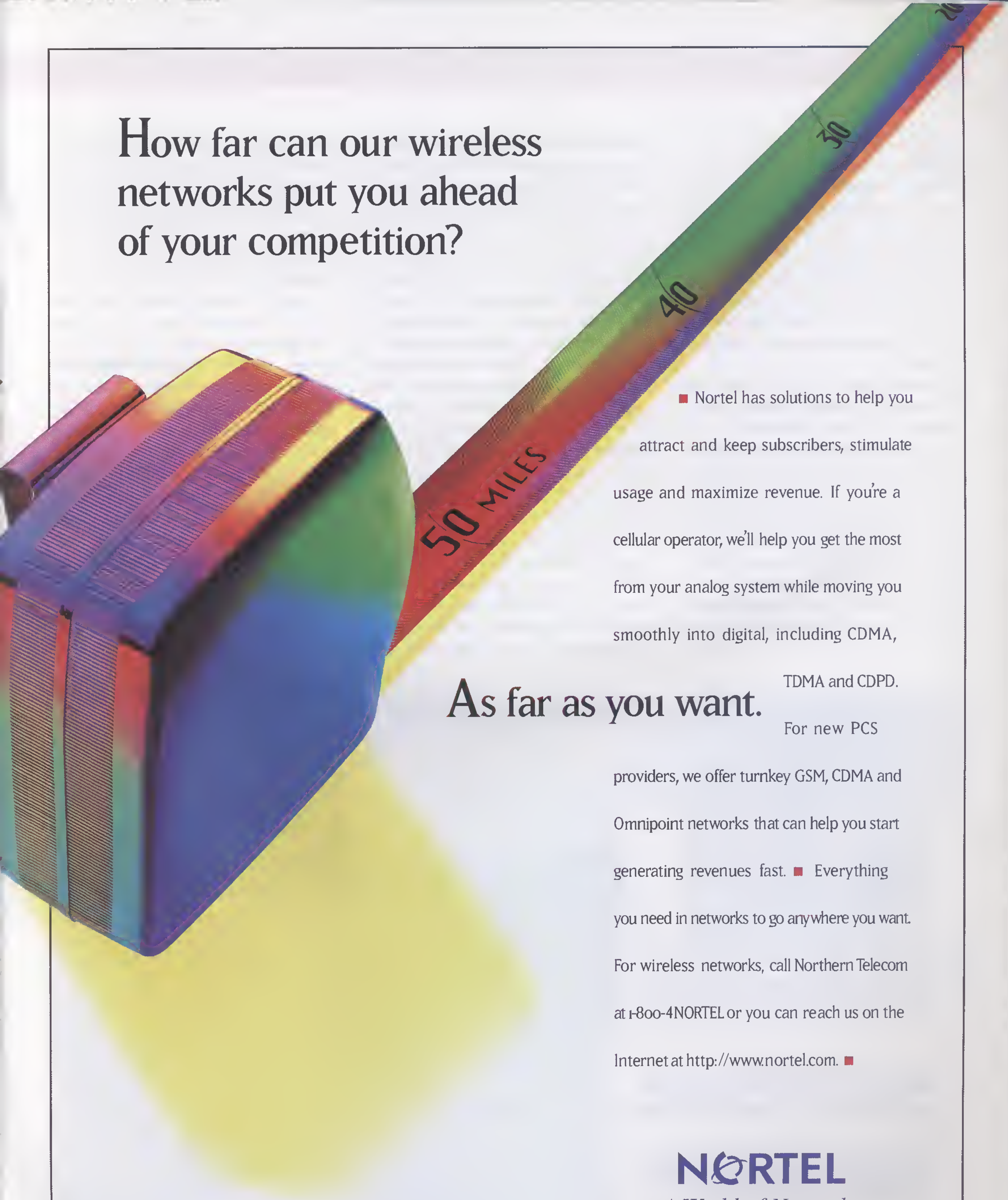
"Ron's lineup will look like the best of cable," Murdock says of Anchor Pacific's package. But she anticipates "we'll see more new market entrants on the video dialtone side," where channels will be "sold to anyone who can pay the tariff." For every HBO and Discovery Channel, she expects to see another unknown, new player. "You may get more diversity."

But don't look for any cable access programming a la "Wayne's World." For video dialtone, Murdock says the transport cost is high enough that programmers "have to be pretty well financed."

However, most of this is guesswork. Murdock admits there's no way to predict what will wind up on the VDT network. The uncertainty creates a "real challenge for marketing," she jokes.

It's no laughing matter, however, to go

continued on page **42**



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PAC BELL

continued from page **40**

up against entrenched cable TV providers with an offering that looks suspiciously like the competition's. "We will have some packaging and pricing that will be very attractive," promises Dorchester. "I'm not going to tell you what that is—there's no point in me tipping off [competitors]."

Murdock offers a clue what it might not be. She says the RBOC conducted extensive market research regarding special-interest packages such as those created by U S West (e.g., grouping sports channels). "They didn't test as well as we expected," she says. Plus, she notes that "program costs go up as you break channels up," which makes it "difficult to make the economics work." But other concepts were a hit with consumers, such as allowing them to pick the channels they want. And though the RBOC can't act on this research, at least not in the VDT arena, it can feed this information to programmers. "We've worked very hard to work with video dialtone programmers and provide market research on what the competition has, what people want," Murdock says.

Dorchester thinks first and foremost, people want their analog TV. "Clearly that's what consumers understand today," he says. When you say HBO, people know what you mean. "When you say digital interactive, few people understand." That said, he believes digital is a key factor in the VDT game. "Differences are going to come in the digital platform." Murdock concurs. "Ron is right. Digital is something we will have that cable companies can't replicate."

But digital's not there yet. "We still have the interactive stuff [technology] in the lab," she says. "As soon as it's 'baked' enough, we'll roll that out." She anticipates that when Pac Tel goes after paying customers in February 1996, some will receive digital, interactive capability, but the technology "couldn't support every customer." She adds that the "difficulty isn't content," it's the technology. Multiplayer games over the network are "a lot farther out" in the future than video on demand.

So out of the box, Pacific Telesis only will be offering subscribers cable TV and true movies on demand with "full VCR control," she says. In lieu of dazzling digital content, the RBOC hopes to lure customers with a state-of-the-art network, superior picture quality and "much superior customer service."

That strategy could work temporarily. Dorchester, who previously owned and operated cable TV systems, admits that a few of his former peers "did a profoundly poor job" of operating their networks and responding to customers. "We've got the penultimate network provider" with Pacific Telesis, he says, which should be music to the RBOC's ear.

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However, he strikes a discordant note: "Cable TV heard the wake-up call." Operators aren't about to stand still and let telcos walk away with their business; most are upgrading their networks and improving customer service skills. To stay ahead, Murdock acknowledges Pac Tel will have to deliver those highly touted interactive services.

WIRELESS STRATEGY

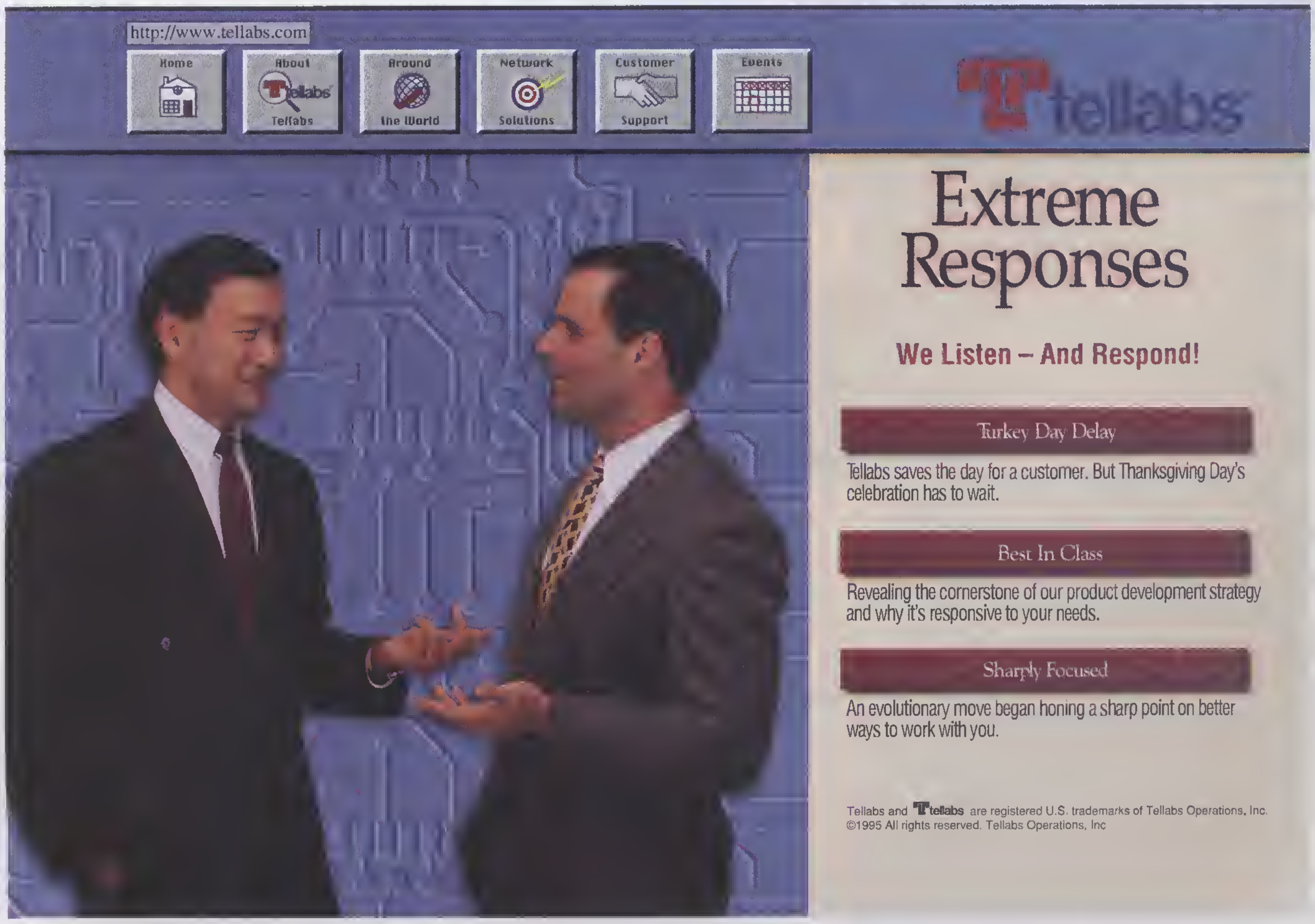
No such pressure on the wireless side. The RBOC's Tele-TV venture is putting together the programming for the company's wireless digital cable offering, which may resemble DirecTV more than VDT. Though the wireless business is wholly owned and controlled by Pac Tel, it's more closely related to cable TV than telephony and isn't expected to be interactive—simply superior quality and "a nice program guide." In fact, the entire wireless cable service could look more like digital broadcast than the RBOC's VDT lineup. "We hope the product lines will look similar," says Murdock, "but the business model is quite different [for wireless cable]. It's much more similar to the cable model.

"We'll go through a classic market analysis" in determining where to offer wireless digital cable, taking a "fairly traditional approach," she adds. The RBOC will look at population concentration and where it can reap the most revenues for the least cost. However, Murdock insists wireless is a "complementary service" to wireline, not a substitute for it.

Though Dorchester is involved with Pac Tel only on the VDT side, he applauds the RBOC's wireless gambit. "It's a brilliant strategic move. They go from standing still to 5 million homes in a heartbeat." He notes that it took CATV operators 40 years to build out their networks; Pac Tel "gets to be in business right now."

The wireless option also allows the telco to build its wireline network more judiciously. Murdock says the VDT network has more "economic value on the telephony side" anyway. It is being deployed "where on the telephone network we have high maintenance costs [and] need to upgrade," she explains. With wireless cable available in Southern California, for example, the company can rebuild its wireline network there at a slower pace and focus on areas where upgrades are most sorely needed or where there is a competitive threat. "You may see us going places [with video dialtone] where we may not get the highest video numbers," Murdock says, but where the RBOC faces the "greatest threat to our core business."

Where does this leave a programmer like Anchor Pacific, which formed a year ago simply because of video dialtone? "Clearly we are taking a risk," particularly if Pac Tel scraps VDT in favor of wireless, Dorchester says. "But I absolutely believe they believe in providing wired broadband distribution." ■



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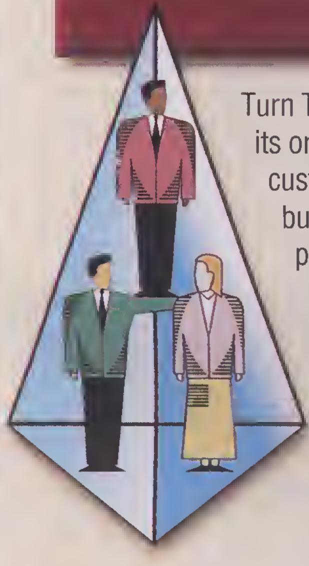

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■ WIRELESS

WIRELESS LOCAL LOOPS

They're hot overseas but how will they play in the U.S.?

Mark Dziatkiewicz
Technology Editor

Wireless local loops are hot—internationally—but domestic markets have yet to move beyond experimentation. And while economics previously forestalled talk of implementation, service, spectrum and PCS issues now present the main obstacles to a technology that once seemed a clear winner.

Some maintain there is no active U.S. wireless local loop market—though the question may be one of semantics. Internationally, there's clearly a fixed wireless local loop replacement technology. "It's a quicker way to get a telephone out there, as opposed to laying a copper or fiber cable," says Tsippora Dingott, assistant vice president-business development at Bellcore.

International markets developed first because telephone penetration is drastically low compared to North American markets. "I've gone into urban areas and seen where there's no telephone service," says Walt Stanek, manager-global business development for AT&T Network Systems. "In China, the payphone is the typical way people make a call, and maybe there's one or two on a block."

International applications—and most products—deliver basic telephone service on fixed wireless local loops. For some time, the U.S. definition was similar. "It's a wireless technology for any piece of the transmission facility to a resident," adds Dingott. "A lot of times people look at it as the last piece of the loop, but it's not just [the segment] to the house. It includes other segments and covers all wireless technologies."

But domestically, spectrum scarcity, PCS and mobility issues complicate that simple definition. "[Wireless local loop] technology in the U.S. is no different than PCS," says Steve Sazegari, principal of Tele.Mac, a technology research company. "We see the wireless local loop market as not necessarily a distinct market in the U.S.," adds Mark Lowenstein, analyst with the Yankee Group.

Mobility's the primary sticking point. It previously was thought impossible to accomplish mobility with fixed wireless systems, but technology kept moving and so has the definition. "It's replacing or adding onto someone's home phone the added value of mobility," says Dingott.

Vendors differ on definition—probably depending on product offering—but fixed wireless dominates. "A lot of people are talking about low and high mobility; the differentiation is, we're offering fixed wireless," explains AT&T's Stanek. Motorola seems rooted in fixed wireless but is sprouting mobility growth. "We view the wireless local loop as fixed telephony service that can be delivered by a system dedicated to fixed provisioning or via a hybrid fixed/mobile network," says Bill Marsh, director-product management/wireless local loop.

Unisys holds firm on fixed wireless. "We do not include mobility as part of our product offering," says Sanjeev Sarbana, director-business development/communications line of business. And it offers reasons for definition shifts. "The reason you're seeing some of the verbiage and lack of clarity is, a lot of vendors are trying to address the market, and they're offering what was a cellular system intended for mobile users," claims Mark

*continued on page **48***

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WIRELESS LOCAL LOOPS

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Rafter, Unisys director-technology/communications line of business.

TECHNOLOGY

Despite definition differences, wireless local loop architectures parallel their more-mobile wireless cousins. Base stations situated at central offices can serve customer locations as far away as 30 km (18.6 miles) with Unisys's CDMA-based system. "The local loop has traditionally been shorter than what wireless local loops address," continues Rafter. "You're able to address large quantities and greater densities than typical local loops. But we can also go from the central office forward to a remote site and distribute from there and it looks more like a microcell."

Other system configurations more closely resemble cellular architectures with base stations, radio ports and subscriber units. Motorola includes all three components and tailors implementations for network operator preferences. "You have three parts of the network: air interface, control and network interface," explains Marsh. "Our goal has been to provide as much flexibility in allowing mixing and matching of air interfaces to different network interfaces."

PACS, based on Bellcore's WACS and Japan's Personal Handy Phone, offers another base station-radio port architecture alternative. It provides wide coverage and significant wireline qualities. "It was invented similar to the way wireline works, more than cellular," says Bellcore's Dingott. "It's equivalent to wireline quality." Combining fixed wireless and mobility, PACS is an attractive PCS technology option. "In the U.S., if you're looking at the PACS technology, the main focus is not just for wireless but also for pedestrian mobility, taking your cordless to the neighborhood and beyond."

With or without mobility, voice quality is a focus in most wireless local loop systems. Originating as replacement technology, fixed wireless must offer wireline equivalence. "In telephony at home, you have a wired set and expect a certain quality," explains Steve Formhals, area manager-current planning/loop for Southwestern Bell Telephone. "But when you buy a wireless phone service, expectations are less. We're looking to offer service transparency—subscribers wouldn't even know the difference of a wireless local loop from a wireline. In some cases, we think the service would be better."

Systems provide high quality with 32 kbps—up to 64 kbps—voice and service feature transparency. This differs sharply from digital cellular or PCS technology using 8 kbps voice encoding and higher. "In using wireless loop technology, I've noticed a very clear sound," continues Formhals. Service transparency is an important issue whether looking at wireline replacement or PCS opportunity—subscribers want wireline and wireless service equivalency. Most wireless local loop systems live up to the challenge. "Existing prototype equipment won't support every vertical service, but it will support most of them," he says. Vertical services include caller ID, call waiting, personalized ringing and others. "It's not that they don't work, it's just that some weren't designed into the equipment."

"We can provide a premium service," adds Unisys's Sarbana. "If you take any POTS line, we can provide all the features it provides—it's not a handicapped POTS line."

Air interface debates may continue with wireless local loops, but several systems use CDMA. While CDMA is unproven in mobility applications, fixed wireless poses fewer technology hurdles. "We feel confident in being able to deliver what we're offering because of the fixed aspects," Sarbana says.

CDMA spread spectrum technology includes several promising features, such as pseudo-encryption. CDMA's signal scattering contributes to frequency reuse and reduced interference as well, Rafter says.

DOMESTIC FIT

Wireless local loop technology has many potential domestic applications. Examples include rural as well as urban replacement, overlay and new growth opportunities. "It's been seen as beneficial for the two ends of the spectrum," says Dingott. "A typical example is very rural, but it's also thought of in the extreme urban environment. It's where you have to send an armed guard with your repair person, where the cost of maintenance is high."

Urban construction issues weigh heavily as well. "There's a lot of potential for urban feeder relief," contends Sarbana. In dense urban areas, full conduits and street-opening complications constrain service growth opportunities. Wireless deployment saves significant construction dollars by avoiding street dig-ups.

Suburban environments offer similar benefits, according to Formhals. "We're doing a trial on a wireless local loop replacing the last 1000 feet of distribution and drop wire," he says. "It's cheaper to place and maintain than a copper network."

Southwestern Bell is evaluating equipment and trialing service in suburban St. Louis. "It's only a test, but we're looking at architectures you could use. In our case, we're not looking at an overlay. We would actually replace or install this in lieu of wire to the customer premise," he says. "A high percentage of expense is in the drop and the last portion of distribution."

Remaining applications include competitive opportunities—with or without mobility—tied to PCS spectrum. "There has been increasing potential in PCS license bidders who are contemplating wireless local loops as an application for that spectrum," contends Motorola's Marsh. "In the United States, unlike the rest of the world, you have very high telephone penetration, so the real application for wireless local loop is principally competitive—going and trying to attack another operator's existing wireline business. Or defensive, in which you use wireless local loop to reduce your operations and maintenance costs and therefore be able to respond to competitive threats in a cost-effective way."

Spectrum—or lack thereof—complicates domestic wireless local loop opportunities. It's so jammed that PCS licenses may represent the only near-term available bandwidth. Southwestern Bell's using an FCC experimental license for its test. It was part of an RBOC petition requesting wireless local loop spectrum set-asides.

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NEW SERVICES

INTEGRATED WIRELESS MAKES ITS MOVE

Carriers and vendors begin blending cellular with wireless offices. Will anyone make money?

Vince Vittore
Associate Editor

Until this spring's broadband PCS auctions, cellular carriers had a somewhat cozy arrangement. With only one other competitor in a local market, matching the cross-town rival on price was easy. With the introduction of at least one—and probably four or five—more competitors, price matching won't cut it.

In preparation for such a market, some carriers and lots of vendors are experimenting with integrating wireless PBX/centrex systems with macrocellular environments.

One of the first major carrier deployments is under way in Wallingford, Conn., by Bell Atlantic Nynex Mobile. Using Motorola's INReach system, 60 employees will be able to use their cellular phones to make calls inside their offices over the existing PBX.

The system interconnects with almost any PBX or centrex system, and the calls are charged via the regular landline system rather than through the cellular carrier. Off site, the same phone can be used to call over the cellular network. Under Bell Atlantic's program, customer service, operations, engineering and human resources workers will use their cellular phones as extensions or substitutes for their desk phones.

The two RBOCs also will demonstrate the system's ability to provide total mobility solutions. More than just providing executives a toy for roaming around the office, the system gives carriers another card to play in bidding for corporate cellular accounts. By offering a fixed rate for in-building calls with the added benefit of mobility, Bell Atlantic Nynex can bundle its own cellular network to give a complete mobile solution.

End users must decide how much they are willing to pay for mobility in the office or around a campus, says Barry Goodstadt, director-wireless industry consulting for A.T. Kearney. "It's really the monthly that's fixed. That's just an access charge then. And it must be viewed relative to what people have to pay for wired access. The question is, is mobility important enough to pay a premium?"

For many users it will be. For those less inclined to sign on, carriers could sweeten the deal. "If it's a big enough churn with a big customer, it may be worth it to give it away for free," says Grace Jenkins, product manager for INReach.

Vendors and analysts agree the goal is to view every call as a potential cellular call. "You charge relatively low rates for inside usage and probably lock up their business for the outside cellular," says Hal Zarem, business manager-wireless for Ortel. "They're looking to lock up your cellular business and you end up with a good close relationship."

TECHNOLOGY CHALLENGE

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TECHNOLOGIES

WIRELESS INTEROPERABILITY

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ficult in real life. Before carriers can start looking at total solutions, they need to decide which technology path to follow inside customers' buildings. Currently, there are two paths to the totally mobile environment—unlicensed PCS spectrum and licensed or cellular bands.

In the unlicensed band, several air interfaces can be used. Carriers also can preserve their spectrum for users who have demonstrated willingness to pay a premium by purchasing a mobile handset. Goodstadt sees this approach as more likely from the carrier perspective. "I'm not so sure they want to allocate that spectrum inside the office. You also probably want a wired solution from the wall to the MTSO."

> THE ONLY PEOPLE WHO MAKE MONEY ARE THE VENDORS. YOU'RE GOING TO NEED ALL KINDS OF CUSTOMER PREMISES EQUIPMENT TO MAKE THIS THING WORK.

Several vendors already are manufacturing products that use the unlicensed band, and carriers seem to be picking up on their efficiencies. Ericsson is one of the latest to jump into the market with its SuperCordless system, which is being marketed as a low-mobility solution for indoor and outdoor environments. SuperCordless will hit the market in second quarter next year using unlicensed PCS spectrum. By yearend, a version using the licensed band will be available. In both cases, the company is one of the few using the DCT air interface.

"The unlicensed product has the same features. It's virtually the same product, but the power levels are different," says George Fraley, senior product manager for Ericsson. So far, the company has yet to sign up any major carrier customers for SuperCordless. However, several, including Pac Bell Mobile, use its previous-generation unlicensed systems.

Bell Atlantic also has picked up on the idea and now is marketing SpectraLink's Pocket Communications system as an adjunct to its centrex service. The system gives carriers an added feature to offer and adds nothing to network costs.

LICENSED BAND

Carriers' other option is to use their licensed spectrum. Several vendors, including those using unlicensed bands, have been pushing the idea. Motorola is a recent example with its INReach.

The system is meant for phones conforming to the IS-88 (AMPS), IS-94 (TIA in-building standard) or IS-91 (N-AMPS) standards, and operates by searching initially for a control band not in the 800MHz range. The company hasn't announced plans for the 2GHz band yet, but could accommodate carriers with A- and B-band PCS licenses.

If the system connects with the PBX, calls are billed through the normal landline rates. "It's a little programming quirk we use," says Jenkins, adding Motorola is not producing handsets specifically for the system but will program phones that conform to any of the three standards. "There's nothing proprietary about the phone."

A big advantage of using the licensed band, particularly for BTA licensees, is that it provides an interface with corporate customers, says Zarem. "They want to make sure they have control of their frequency band. This is a strategy that some definitely will follow."

Regardless of which strategy carriers follow, most agree the in-building portion must look and feel like a wired phone—regardless of its location. "I think you're going to see customers getting lots of options. They want the ability to call-forward their business number so they can choose exactly what they want to do," concludes Zarem.

Some vendors already are looking at adding more functionality, such as integrating their systems with single-number and/or advanced messaging software.

Despite its experience in the UK and Hong Kong, Nortel is pursuing a project in Canada involving next-generation CT2. CT3 service lets consumers use wireless handsets to make calls in public locations without handoff capabilities.

The company also is investing heavily in PHS-based systems and Omnipoint, which holds the New York A-band PCS license under a Pioneer Preference. Though it is producing GSM-based equipment for high-mobility applications, Nortel is not getting too involved with DECT, which some are promoting as a good air interface to interoperate with GSM-based systems. "DECT seems well suited to wireless PBXs. When you compare it to Omnipoint and PHS for low-mobility, it falls short," says David Twyver, Nortel's president-wireless networks.

Motorola is investigating several options with INReach, including adding the ability to search other in-building systems and find users, according to Jenkins. "There's a lot of 'what ifs,' and it depends on how you want the system set up. Knowing where you are is not a problem. It's delivering a call from your home system."

Motorola also is studying how to support existing services such as digital centrex (currently, it supports only analog service) and supporting many vendors' PBXs (the initial version supports AT&T and Nortel PBXs with a Siemens/Rolm model coming on line). "The technology depends on looking like a desk phone to the PBX. Our hope is that there will be some standard developed soon."

SKEPTICS ABOUND

Regardless of which path carriers follow to wireless integration, they must answer the all-important question: how do we make money off this? In both licensed and unlicensed scenarios, carriers shouldn't expect to hit the jackpot right away, says Goodstadt.

In fact, he thinks the business case for an integrated wireless service will be tougher to assemble than the technology solution. "This is a market I have long thought would have taken off long before PCS. The question, though, is how do you make money. The only people who make money are the vendors. You're going to need all kinds of customer premises equipment to make this thing work." ■

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■ WIRELESS COVERAGE

'LEAKY' COAX PUSHES WIRELESS INTO DIFFICULT ENVIRONMENTS

Douglas Fishman

With the cellular industry's rapid growth over the past 12 years, demand for highly reliable service has become more important. As subscriber penetration reaches and exceeds 10%, customers will not tolerate "spotty" coverage and dropped calls. If a carrier's service is perceived to be inadequate, customers can switch to a competitor, or eventually a PCS provider.

One way to minimize customer turnover is to improve coverage within service areas. Cellular carriers are competing fiercely to provide service in areas previously ignored—indoor arenas, convention centers, office buildings, malls and tunnels—especially in high-profile locations. RF engineers' approaches to covering these hostile RF environments include using a single point-source antenna, using a multiple antenna system and using a leaky coaxial cable RF distribution system.

Case in point: in New York City, both Cellular One and Nynex Mobile recently began providing cellular service in the Lincoln Tunnel, giving coverage to thousands of commuters. The RF solution employed by both carriers consisted of a series of couplers and splitters to interface three-mile-long runs of leaky coax cable with their RF sources. Specifically, Nynex Mobile used a series of three microcells to feed three tubes, which transported RF signals from a cell site some five miles away in downtown Manhattan.

Leaky coaxial cable, also known as leaky cable or radiating cable, is an effective tool for providing coverage in underground environments such as the Lincoln Tunnel, as well as many in-building environments where RF coverage from the macrocellular network is inadequate. The cable also lets multiple services share the same length of cable. This capability was used in the Lincoln Tunnel by the two cellular carriers and a private mobile radio service operating at 850MHz.

Leaky cables are inefficient RF conductors designed to radiate a portion of their carried signals as they propagate along the cable's length. Slots cut into the outer conductor of the cable at regular intervals allow RF transmissions to "leak" out of the cable, as well as coupling received signals into the cable. This leads to a uniform distribution of RF energy throughout the covered area, in contrast to antennas, which provide spotty coverage depending on placement and environmental multipath.

As signals propagate down the cable, attenuation occurs due to loss of energy from the slotted openings, as well as the ohmic effects of the cable's conductors and dielectric losses normally occurring within a cable. The amount of attenuation depends directly on cable length and diameter, as well as frequency of operation. Usually expressed in terms of dB/100ft or dB/100m, attenuation increases with increasing frequency and decreases with increasing diameter. For example, attenuation in ⅞″ diameter leaky coaxial cable is on the order of 1.1dB/100ft at 450MHz, but is 1.6dB/100ft at 900MHz. Also, at 900MHz, ½″ leaky cable will have on the order of 2.3dB/100ft, while a thicker 1¼″ cable will have only 1.2dB of loss per 100 feet.

The last factor affecting attenuation is the cable's mounting. Mounting the cable directly to the wall increases attenuation due to RF energy being absorbed by the wall itself.

COUPLING LOSS

The term commonly used to describe RF energy leakage from slots in the outer conductor is "coupling loss," typically defined as the difference in power between RF energy within the coaxial cable and RF energy present at 20 feet perpendicular to the radiating cable. As the field strength at 20 feet is not constant due to multipath effects from the environment, coupling loss usually is defined as a median value, (there is an equal probability of the signal strength being greater or less than the specified value).

For most wireless applications, a certain minimum coverage typically is required, with a much higher service probability than 50% demanded. To address these non-median cases, cable manufacturers provide

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Circle 293

LEAKY COAX

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a cumulative distribution versus coupling loss curve to let engineers determine appropriate loss values for the application.

Other devices may be needed in conjunction with leaky coax cables to provide coverage. These include cable taps, splitters, point-source antennas and in-line amplifiers. Cable taps are passive devices that provide a method of coupling RF energy into and out of a leaky coax cable trunk to a branch section without significantly affecting attenuation or impedance of the main run. They are screwed directly into the main cable and typically couple the energy at roughly -8dB at 900MHz, with a minimum insertion loss (1dB) on the main cable.

RF splitters also divide energy off a main cable run, but the division of energy is equal among each resulting path. RF splitters usually are two-, three- or four-way devices, resulting in 3.5dB or 6dB of insertion loss over all branches.

Point-source antennas also can be used in conjunction with a leaky coax system to provide coverage at the end of a cable run. In a typical application, the leaky cable could cover a train tunnel, and a terminal point-source antenna would cover the station/platform at the end of the tunnel.

For applications requiring very long coverage runs, cable attenuation may prevent complete coverage. To address this situation, in-line bidirectional amplifiers (BDAs) typically are used to boost the signals by 10dB to 20dB. If required, multiple BDAs can be used to provide extensive coverage. Note, however, that with each additional BDA, system noise increases—eventually to unacceptable levels. Manufacturers generally do not recommend cascading more than five or six BDAs in any one leaky coax cable run.

Once familiarity with the appropriate technical parameters is achieved, engineering a leaky coax cable system becomes straightforward.

The best approach to solving a tunnel coverage application is to access the tunnel at a central point where signal strength is maximum. This also corresponds to the point where coverage from the macrocellular network is minimized. Using a splitter at a tunnel entry point, two separated RF coverage paths can be engineered to provide desired signal levels.

ECONOMIC ISSUES

Although this solution will work, it may not be the most cost effective. Economic issues involved with leaky coax system design are almost as important as technical concerns. The cost of a leaky coax system is directionally proportional to the cable's construction, length and diameter. Some variations in construction include varying thickness of copper in the outer conductor (thicker is costlier); use of aluminum instead of copper in the outer conductor (copper is costlier); and flame retardancy added to the cable sheath (also additional cost). "Premium" cable can run significantly more (50%) than "standard" or "economy" cables, which may have similar mechanical performance but inferior RF performance.

The diameter cable chosen also will significantly affect the overall cost. A 1¼″ cable can cost as much as $14/ft, while ⅞″ cable can run as much as 40% less.

Leaky coax can provide the cellular engineer a tailored solution to difficult RF coverage environments, particularly tunnels and in-building applications, where uniform coverage and RF containment are important. Engineers must be aware of the many properties of leaky cable and choose the appropriate solution based on a combination of RF properties and economic concerns. Because of its uniform coverage and simplicity of engineering, leaky cable is becoming the RF distribution tool of choice for many cellular carriers for difficult RF environments. ■

Douglas Fishman is a senior applications engineer for ADC Telecommunications, Wireless Systems Division.

■ HOT PRODUCTS

ALLEN TELECOM INTEGRATES MACROCELL WITH INSIDE COVERAGE

Vince Vittore
Associate Editor

If wireless carriers are to become full service communications providers, their top hardware priority must be integrating indoor cellular coverage with the macrocell environment.

Allen Telecom Group (ATG), which has a long history in antennas and related hardware, is taking one of the first cracks at the problem with its new generation of microcells. The Smartcell, introduced last year to extend cellular coverage inside, has been redesigned to serve several new configurations.

It can enable a hybrid link between an internal wireless PBX and the external cellular network. The system also can be configured as a wireless adjunct to a PBX or can extend cellular coverage to rural and suburban environments. And it can provide pedestrian coverage as a typical microcell.

"We want to build a system that would solve a lot of different macro- and microcellular applications," says Dale Bastian, vice president-North American sales and marketing for ATG.

Currently, the system operates in the 800MHz-900MHz range and can be tuned to use AMPS or ETACS air interfaces.

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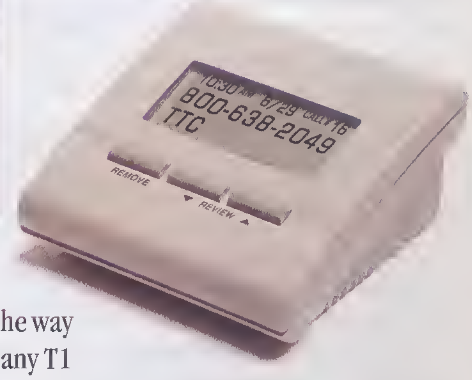

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ALLEN TELECOM

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The system can be configured for digital handsets as PCS providers hit the market.

"The feeling was, if you put a microcell in the building, let's use it as part of the network," Bastian says.

When the system is configured as a hybrid system, it not only can provide coverage inside and outside, it can perform a handoff between a wireless PBX and the macrocellular environment. Because it operates in the same frequency, the handoff centers around increasing handset power on the fly. "We also can provide a seamless hand-in. This is not only a requirement, it's a big technological leap," says Bastian.

> **YOU HAVE TO STEP BACK AND ASK, WHAT'S IN THIS FOR THE CARRIER? IT ALLOWS THEM TO LOCK UP MAJOR ACCOUNTS AND LOCK UP THE OUT-OF-BUILDING USAGE.**

VLR INTEGRATION

Just as important, the Smartcell hybrid configuration includes VLR, which opens up a wireless PBX to outside users and locates callers even when inside a building. It also has integrated an IS-41 link to communicate with the outside cellular environment.

At the system's heart is a wireless control platform (WCP), which Bastion likens to a miniature MTSO. Inside the WCP, all communications links and signaling information are processed and passed to the appropriate end points. A T1 link connects the WCP directly with the public network as well as the PBX interface and internal microcells.

The system has been going through internal trials with ATG, but the company expects to announce commercial applications soon.

Bastian says the company is marketing the hybrid configuration as a disaster-avoidance system because it allows users to jump onto the cellular system should their landline provider experience a service outage.

For carriers, ATG will be playing up the potential role of all-in-one wireless service provider.

"You have to step back and ask, 'What's in this for the carrier?' It allows them to lock up major accounts and lock up the out-of-building usage," says Bastian. ■

■ HOT PRODUCTS

DGI FRAMES PLAY OFF BIG SWITCH PLAYERS

WIRELESS PRODUCT - Despite lawsuits, DGI's Lyle Kaufman is moving into the wireless arena with a new digital interface frame and cards to support carriers using Motorola's EMS-2500 switching system.

Vince Vittore
Associate Editor

It's not easy being the scorn of an industry, but Lyle Kaufman is getting over it.

"Everybody hates us but the customer," says the president of DGI Technologies.

That's because the little Richardson, Tex., company has been something of a thorn in the side of big vendors by producing high-density, low-cost frames that interconnect with the big guys' systems. The latest version of DGI's frame aims directly at the cellular market.

The DIF-2060C HD high-density digital interface frame allows cellular carriers to expand Motorola EMS-2500 switching systems originally manufactured by DSC Communications. The frame, which is a redesign of a previously-released product,

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DGI

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contains six shelves and provides a 50% increase in port capacity. It offers 2304 ports per frame in the same space that previously offered only 1536 ports.

Key in the redesign was new PCMI shelves, which previously took up four shelves. "We completely redesigned the PCMI shelves for the high-density version, and that left us two shelves to work with," says Kaufman, The standard frame now has four bus and two PCMI shelves, he adds.

The frame also includes standard DGI card complements, power supplies and integrated alarm assembly and high-density PCMI clock and interface cards. As a unit, the frame can increase capacity by 50% in the same footprint as traditional frames.

CELLULAR PROVIDERS ARE PLANNING FOR A 25% ANNUAL GROWTH RATE. IN 1994, IT WAS MORE LIKE 50%.

Just as important, the frame reduces power consumption, eliminating need for special cooling systems, which can eat up half the floor space in a remote location.

"Cellular providers are planning for a 25% annual growth rate. In 1994, it was more like 50%," says Kaufman. "They just don't have the room for that growth."

On an application level, one of the frame's key differentiators is its ability to handle wireless data applications, including those based on CDPD. The frame passes 64 kbps clear channel DS0 signals, catching many carriers' eyes, says Kaufman. "A lot of customers are taking our cards and plugging them into Motorola frames." The company's complement for each shelf consists of 13 cards: eight trunk interface cards, two bus terminator cards and three microprocessor cards.

Customers trialing the frames include Sprint, Bell Atlantic Mobile, AirTouch and Alltel Mobile. ■

■ HOT SERVICES

WINSTAR PUSHES INTO U.S. PCS MARKET

Company aims to connect sites using 38GHz wireless systems; also wants co-carrier status.

Vince Vittore
Associate Editor

With its technology already up and running with European PCS providers, WinStar Communications is setting its sights on the domestic market.

In September, the company unveiled what it calls PCS Express, a service that connects PCS sites, repeaters, network hubs and MTSOs with 38GHz wireless systems. The company also is talking about plans to offer its services to consumers, having filed recently for co-carrier status in several states.

PCS Express will allow carriers to put cell sites in locations that may not be economical for others because WinStar uses a small dish antenna and connects sites without physical T1 lines. For new carriers, this will be particularly important as site development costs increase, says Barbara Garrett, vice president-marketing for WinStar.

And as those with licenses attempt to crack open new markets, connecting sites without landlines provides investment protection, she adds.

"If they think they need a huge capital investment and they're wrong, they just need to redirect a dish," Garrett explains. "They can reconfigure their network as they learn what their traffic pattern is. It's going to be a huge benefit to them."

On the consumer side, the company now has licenses allowing it to provide 38GHz service in 40 of the top 45 U.S. metro areas. And with ever-increasing capacity, it may market video services to consumers and businesses.

Using current technology, the company provides as many as four DS1 channels per radio over a 100MHz band to end users. By yearend, that will increase to a single DS3 per radio, and some suppliers claim they have the technology to bring in an OC-12 stream, says David Ackerman, executive vice president.

"Today, nobody has the bandwidth to do true video on demand," Ackerman says. "They're trying to build monstrous pipes, and that's going to take billions of dollars and who knows how many years. So while everyone talks about video, we know we can do it."

Nor is the company worried its applications for co-carrier status will scare off competitive local exchange carriers, thus far one of its best markets, he adds. "It's an expectation that everyone's going to compete with everyone else."

TODAY, NOBODY HAS THE BANDWIDTH TO DO TRUE VIDEO ON DEMAND. THAT'S GOING TO TAKE BILLIONS OF DOLLARS AND WHO KNOWS HOW MANY YEARS.

Aside from that assumption, he adds, most competitive providers are aiming at a different market, and they will continue using WinStar's technology to extend their serving area.

"To put fiber in would take forever," Ackerman concludes. "We can cover 70% of a city instantly." ■

ZEROING IN ON NEW MARKETS - Texas Instruments has announced a turnkey system for LMDS services and is targeting carriers seeking to compete in advanced services in the U.S. market.

■ WIRELESS INTERACTIVE

BROADCASTING ADVANCED SERVICES

Texas Instruments jumps into LMDS.

Eric Krapf
Managing Editor

Hybrid fiber/coax and fiber-to-the-curb networks will bring dazzling new services to the home—someday. But service providers are looking for ways to move down that road now, and a big player has come up with a new offering it believes can help.

Texas Instruments announced a turnkey system for local multipoint distribution services (LMDS), a wireless transmission technique similar to cellular but operating in the 28GHz microwave band. TI expects to deliver systems to initial customers next year, and says it has alliances with vendors for set-tops, video headends and telephony switches, though it hadn't announced who those partners were as of last month.

TI claims its LMDS system can provide interactive video, data and voice services, in contrast to current one-way implementations of wireless cable or multichannel multipoint distribution service (MMDS).

While RBOCs seem to view MMDS as a stopgap or transition, "we see a long-term role for LMDS," says Thomas Kilgo, TI's LMDS business manager. "We believe the system will be very attractive to any service provider in the telecommunications industry," especially "anyone that's looking at the market from a competitive access standpoint."

Kilgo doesn't believe LMDS will replace wired systems in the U.S., but "in many countries it will be, I think, the infrastructure of choice for the foreseeable future."

LMDS systems require 1000MHz, and are configured much as cellular systems, with transmitter and receiver nodes and antennas in a cell structure. Subscribers will use rooftop antennas and interface units for whatever CPE is being served: set-top, telephone or modem.

SYSTEM CONFIGURATION

TI can configure its system to different frequency allocations, breaking it down into symmetrical 500MHz paths or, more likely, an asymmetrical split, according to Kilgo.

A typical asymmetrical plan—what Kilgo calls TI's "baseline system"—creates 224 digital video channels and telephony for 16,000 subscribers from one node serving a cell six miles in radius.

Frequency allocation must be configured when the node is installed; TI will work with the service provider's potential growth rate and plan for a particular serving area. The provider can put in telephony first and add video, but "we do need a general agreement as to what the frequency allocation will be," Kilgo says.

High-density serving areas and lower cost are among LMDS's chief advantages, according to Deepak Swamy, research manager for Gemini Consulting C4 Lab. Kilgo promises TI's system will cost "significantly less" than HFC, though HFC promises 100% coverage, which LMDS can't match. But LMDS may be reality sooner. "We are much faster to the market," Kilgo says. "We believe we have a timing advantage in the marketplace as well."

Compared to its competing wireless video technology, LMDS "really leaves MMDS in the dust in terms of what it can do," says Swamy. The down side of this capacity is that "to do this stuff, you need a lot of spectrum."

With such a large block only available on the spectrum's high end, LMDS faces concerns about interference from something as slight as leaves dropping in front

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TI LMDS

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of an antenna, says Richard Berg, associate partner in Andersen Consulting's Communications Industry Group. He adds, however, that LMDS pioneer CellularVision has made progress in addressing this concern, and its smaller-scale Brooklyn deployment has been "pretty successful."

While LMDS tops MMDS in channel capacity, signal quality is "potentially comparable," as is CPE cost, Berg maintains. Not only are both technologies cheaper than cable, but more reliable. "There's not a lot that can go wrong with the equipment," as opposed to cable, with its multiple amplifiers and other points of potential failure.

MARKET FOR LMDS

Who may be attracted to LMDS? Bell Atlantic already has shown interest as an investor in CellularVision. Swamy believes LMDS's capacity to deliver advanced services could be crucial in competitive fields that may approach the breaking point.

Some markets may have an incumbent cable provider and direct broadcast satellite offering, as well as the local phone company's offering—brought in over fiber or through the air. Something would have to give: "There's clearly no way markets, at the level they're at now, would support a third provider," he says—unless that provider could offer something the others couldn't.

And even though RBOCs have shown more interest in one-way MMDS, at least they've accepted non-wireline alternatives, says Swamy. Carriers' recent interest in wireless cable shows they're "looking at all the different alternatives they have." And, he notes, "RBOCs are discovering wireless alternatives can be attractive."

Kilgo agrees. "They're getting very serious about wireless transmission."

But how far they're willing to take that interest depends on how well these relatively unproven technologies perform in larger service environments. Andersen's Berg tosses out a note of caution: "Neither LMDS nor MMDS has been exercised in major deployments yet." ■

A WIRELESS FOCUS

AIMING FOR DSP SOLUTIONS

Texas Instruments has been making products for the wireless market as long as there's been a wireless market. A year ago, the company decided it needed to change its structure to focus more on this segment of its business.

TI formed a worldwide wireless business unit and began marketing solutions aimed at all segments of the wireless and cordless phone market. The company's aim: use its leadership position in digital signal processors (DSPs), combined with software expertise, to create solutions that bridge gaps between analog and digital as well as among digital standards. "We are devising kind of a generic platform to address all those markets," says Thomas Brooks, DSP marketing manager/wireless business unit.

In recent months, the company has announced single-DSP solutions for half-rate versions of the major digital cellular standards, allowing simultaneous voice and data transmission. Single-DSP solutions also provide extended battery life and smaller size for wireless units, offering additional customer benefits, Brooks notes.

In a market where no single standard dominates and not everyone's settled on technology decisions, TI believes its customizable DSP (cDSP) can "create a platform that's a superset of what our customers need and quickly get it to market," Brooks says.

The new business unit is coupling the flexible platforms with TI's software expertise, an element Brooks says completes the picture: "What we really are is not just a leader in DSP, but we want to be the leader in DSP solutions."

COPPER PLANT

WHY THEY'RE BUYING *INTO* COPPER CABLE

Eric Krapf
Managing Editor

In 1993, the Alpine Group, a holding company with interests ranging from aircraft parts to apparel, had the opportunity to get into the copper wire and cable business. They grabbed it.

Alpine bought copper cable maker Superior Tele-Tec after a market study convinced officials there still was life in the old medium.

"We came to the conclusion that the telecommunications copper wire and cable industry was exaggeratedly characterized as a sunset business, the lights on which were going to go out imminently," says Steven S. Elbaum, Alpine Group chairman and CEO.

The company's study predicted continuing increases in demand—maybe not double-digit, but respectable. At the same time, the study predicted a shrinkage in the supplier base. "What has happened is pretty much what we expected to happen," says Elbaum.

And Alpine has helped make it happen. Not content with Superior, the company last March purchased Alcatel's North American copper cable and wire operations and is acquiring Philips Cable's Vancouver operations, making Alpine the largest U.S. producer of copper cable and wire for outside plant.

What was so appealing about over-the-hill copper? Partly the fact there's so much of it. Elbaum claims more than $150 bil-

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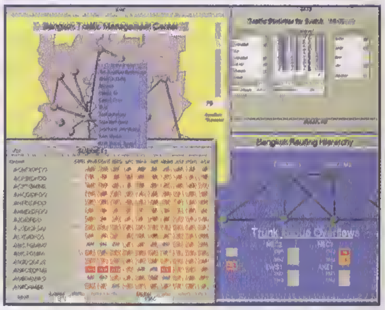

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ALPINE

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lion is invested in local-loop copper nationwide; there are 160 million access lines, with 2.5% to 3.5% growth per year—small but steady.

And the pool of competitors *has* shrunk and changed. Besides Superior, Alcatel and Philips' operations being combined into Alpine, the other two largest manufacturers—AT&T and General Cable—have been sold, also to holding companies.

COPPER WILL DECLINE; "THE QUESTION IS HOW FAST IT WILL GO DOWN," SAYS AN AT&T EXECUTIVE.

Finally, reports of copper's death continue to be greatly exaggerated. The president of Superior (now called Superior Telecommunications), Justin Deedy, recalls he started with the company in 1985, "when everybody said fiber was going to replace copper in five years." Deedy sees continued access line growth fueling copper's rate of growth, however modest. "We think that'll be the most stable." And though there was some dip in demand over the last couple of years as uncertainty over future serving architectures prevailed, growth has returned. "We expect to see the trend continue for installation of access lines."

Though Deedy and Elbaum agree technologies such as ISDN and ADSL promise increased utility for copper lines, both stress it's the fundamental strength of the medium that keeps it attractive.

The question is how long copper will last. Superior has sold $1.6 billion-$1.7 billion worth of copper cable over the last seven to eight years, Deedy says, and "we believe it will stay that way for 10 or 15 years." Copper "does its job very very well, and we think any changes will be very slow."

One executive whose company bailed out of copper agrees—to a point. Copper "can live for a while," but "it sure as heck isn't going up," says Robert P. Mohally, vice president-strategic planning and international markets, AT&T Network Cable Systems. Sales of copper will fall off, he insists—it may be five, 10 or 15 years from now: "You pick the year." Everyone agrees copper will decline; "the question is how fast it will go down."

That inevitable decline drove AT&T's decision to sell its domestic outside plant copper cable business. AT&T concluded its core competency and differentiating factor was its expertise in optical systems: "We went with the growth engine; we went with the core strategy."

BUYING INTO COPPER - Alpine Group CEO Steven Elbaum.

STEADY, MODEST GROWTH - That's what Superior president Justin Deedy sees for copper cable.

Hanging onto the copper cable business would have meant making the investment to develop new products such as coax at its Phoenix plant, Mohally says.

"The issue was, what can we find to replace copper, because copper's going away," Mohally says. The company decided not to replace its copper business, but shed it instead.

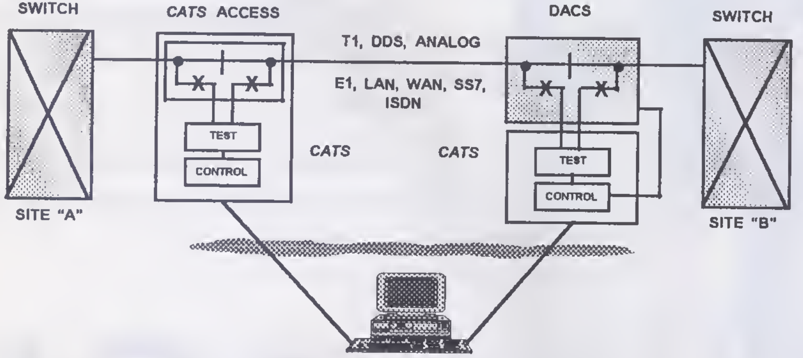
With a few qualifiers. AT&T hung onto its international outside plant copper business and kept its Omaha facility, which makes copper wires for private-network applications, which are growing at 25% annually.

"The private network copper business is booming," Mohally says. "We're staying in that one."

Even Elbaum acknowledges Alpine's long-term future isn't in copper. If, in six or seven years, half the company's revenues aren't from new products, "the sun should be setting on us," he says. Alpine is developing some fiber and coax products for future rollouts, but Elbaum stresses his belief that "right now, the medium to be in is copper."

For the moment, at least, Mohally wouldn't disagree completely.

"I don't want to portray this like I think copper's going away tomorrow afternoon," he says. "They're going to be making copper cable long after I'm dead and buried." ■



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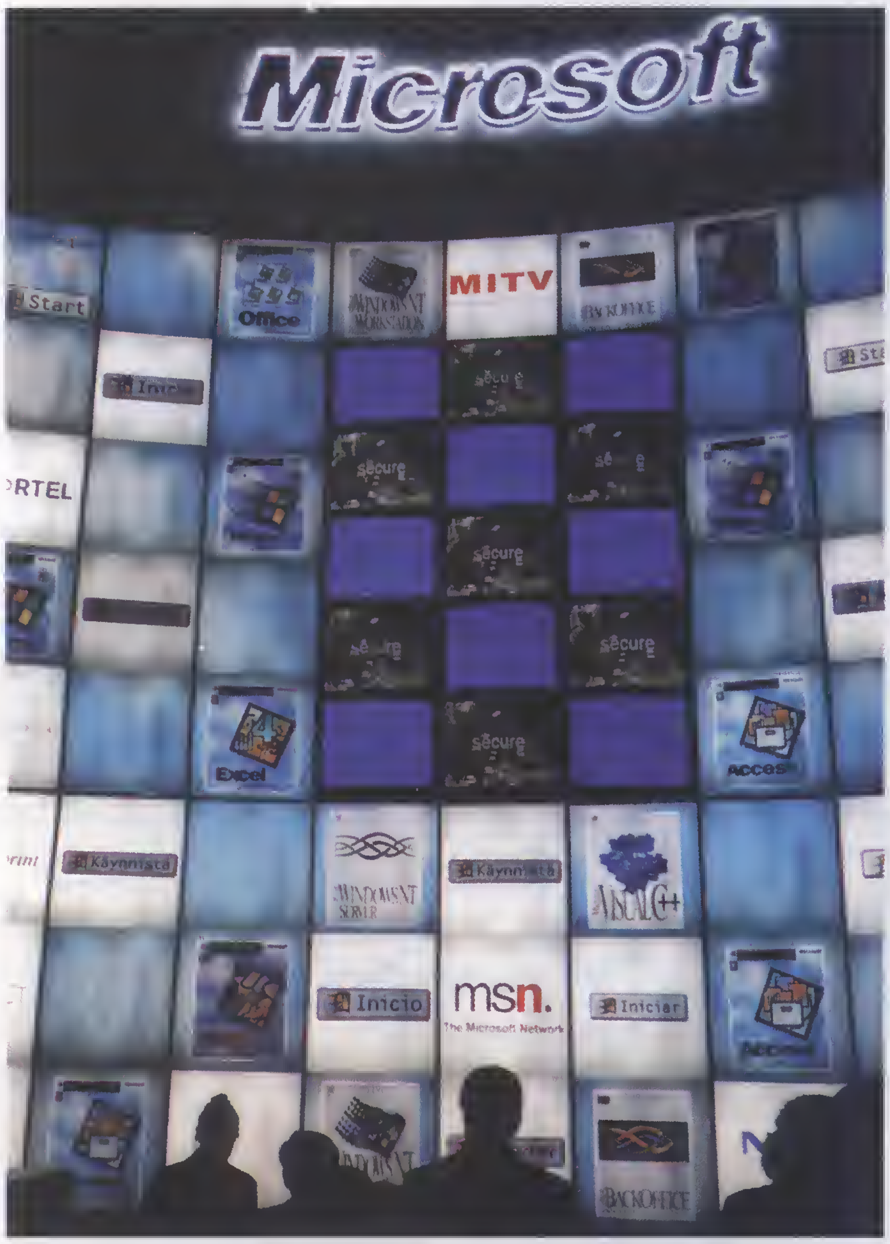

TOWERING ACHIEVEMENT - Microsoft used Telecom 95 to announce a partnership with Strotus Computer.

■ STRATEGIC PARTNERSHIPS

GETTING TOGETHER

Vendors announce alliances en masse.

Vince Vittore
Associate Editor

Providing service in a deregulated, competitive environment will be a challenge to all carriers. Supplying equipment to those carriers may prove equally difficult as service providers pare back staff and ask vendors to do more.

Vendors appear to recognize that the trend will continue and are responding by pairing up. Several, including Microsoft, Hewlett-Packard and ADC, used the Telecom 95 show in Geneva to announce partnerships.

"If you look at the customers, the message is very clear. We've got to be very focused on what we are and what we are not," says Fred Lawrence, senior vice president-transmission group for ADC, which announced two separate partnerships. "My job is to make a quilt. And the objective is the quilt, not the individual patches."

Among those announcing deals, ADC went farthest down the alliance aisle with Hitachi. The multi-phase relationship will begin with a sales and marketing arrangement that combines Hitachi's Sonet and ATM equipment with ADC's broadband access products to create an end-to-end solution. The second phase of the relationship will focus on creating a joint venture.

"We now are on the offensive," says Lawrence of ADC's new position in the market. "We no longer have to sit back and say, 'We're going to have that.' We've got it."

The two companies agreed to start joint marketing and sales efforts before getting bogged down in joint venture details. "We don't want to miss the market opportunity while we're in joint venture discussions," says Lawrence, adding the companies realize the joint venture will be more of a long-term benefit. "That will allow us a more graceful way to deal with some of the R&D issues."

ADC also formalized its agreement with Nokia to develop access solutions based on the Homeworx platform. The two companies competed head to head for a major Australian HFC contract eventually won by ADC. "We're taking our combative relationship into a cohabitation phase," says Lawrence. The agreement, first announced in May, opens up a number of markets for both companies, he concludes. "For us to try to break into the Deutsche Bundespost is very difficult."

Nokia, in its continuing drive to break out of the European market, should benefit by teaming up with North American suppliers that have significant market share. The Finnish company, best known in the U.S. for its wireless handsets, also is getting together with Hewlett-Packard to develop a new generation of handheld devices. Using

*continued on page **66***

PARTNERSHIPS

continued from page **65**

the H-P palmtop platform, the two will unveil a European version of the unit in 1996, with other markets covered in later releases.

The announcement was one of two from H-P, which also will team with Gemplus and Informix to develop credit-card sized personal information cards. The cards will use H-P's cryptography framework structure and allow corporations to offer new secured services such as Internet financial transactions. Gemplus will supply advanced smart-card technology for the project while Informix brings its database and middleware technology.

MICROSOFT MAKES MARK

Microsoft may be the self-proclaimed king of the desktop, but it won't crack the telecom market on name recognition alone. At Telecom 95, it took an important step, announcing an agreement with Stratus Computer to develop scalable, fault-tolerant application development platforms.

The first fruits of the collaboration will be seen by yearend, when Stratus and its subsidiary Isis Distributed Systems bring to market a Windows NT server-based platform. The two eventually will develop more combined hardware and software solutions using off-the-shelf equipment and keeping any platform open.

For Stratus, the addition of a Microsoft partnership makes sense from a macro view. "You start with the end users, and they're using Microsoft products on the desktop," says Joost Verhofstad, director-business development for Isis. "It makes sense to think of the PC as the gateway to a much larger universe."

The company also doesn't see a problem teaming up despite the software giant's vague hints of competing with telcos. "Microsoft is so big, you must look at it as two separate entities, one on the desktop and one in telecom," says Ken Birman, chief scientist. Adds Verhofstad, "You look at what AT&T is doing with Lotus Notes. We're betting on Microsoft, and we think it's a win-win situation. It's going to be great because everyone is using Microsoft already."

Even some carriers used the Geneva mega-expo to get in on the partnering action. Globalstar announced it had signed on 19 more service providers for its 48-satellite low earth orbit system. Among those jumping on board: Globaltouch Communications of the UK, which will provide service in four West African nations, and Mobile Telecommunications Africa, which will serve eight East African countries.

It's becoming obvious no single vendor will attempt to tackle the market on its own. With the anticipation that deregulation, privatization and competition will become global phenomena, most agree that help will be needed and "core competencies" will become a buzzword of the next decade. ■

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WIRELESS SERVICES

WILDFIRE SPREADS INTO THE PUBLIC NET

Eric Krapf
Managing Editor

Sometimes Joshua Touber almost slips up and calls his Wildfire electronic assistant "she."

Admittedly, Touber's comfortable with technology. He's president of Virtuosity, a Los Angeles-based company specializing in virtual office services. And, admittedly, one of the services Touber offers is Wildfire.

But the ability to bond with a voice mail/call forwarding/messaging system is just what Pacific Bell Mobile Services and AT&T Wireless Services are counting on as they join up with Wildfire to offer the service on their networks, in separate agreements that could bring commercial availability in 1997.

COMPETITIVE SERVICES

"Carriers are going to need to offer more than plain old voice services," says Stephen Krom, group product manager for Pacific Bell Mobile.

Wildfire Communications' co-founder notes that's especially crucial in a more competitive wireless marketplace featuring new PCS entrants such as Pacific Bell Mobile.

"Both PCS and cellular providers will need to differentiate themselves, and it's widely recognized that the best form of differentiation is advanced services," says Nick d'Arbeloff, Wildfire's vice president-marketing.

And Lexington, Ma.-based Wildfire has produced one of the more highly touted

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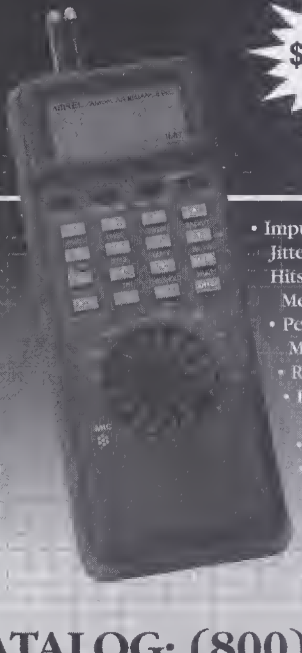

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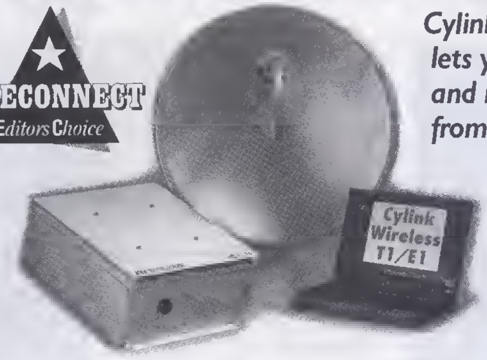

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WILDFIRE

continued from page ***67***

advanced services. The system uses voice recognition and single-number technology to create the "electronic assistant" that answers users' calls and forwards them according to routines they establish through voice recognition. The system also maintains contact lists and can even call a user with pre-programmed reminders.

Krom says Wildfire's intuitive, user-friendly interface means "they have a lead" in their market niche.

But until recently, the only way to get Wildfire was for a company to spend $50,000 to $100,000 for a server accommodating 25 to 75 users; the server resided at the corporate premises and connected to the public network through a PBX or T1.

But in September, Wildfire concluded service provider agreements with Virtuosity and two other companies: Advanced Communication Technology of Effingham, Ill., and Milcom Corp. of Wilmington, Mass. These providers were the first to offer the service on a subscription basis.

GREATER CAPACITY

Wildfire's top priority: upgrading the system for the greater number of users anticipated from network carriers. "The number one specification for our network systems is very high capacity," d'Arbeloff says. The company can get about 500 users on an authorized service provider's system now; d'Arbeloff would like to get this number up to 1000-3000 for network providers.

Adding the public network carriers positions Wildfire to break through to the small office/home office (SOHO) market, d'Arbeloff says.

"Reaching individual business users and the SOHO market is virtually impossible if you're selling a server that's aimed at serving 25 people or above," he notes. Touber's experience bears this out: more than half his 100 Wildfire customers fit the SOHO category.

So far, pricing has varied by usage plans, says d'Arbeloff. Authorized service providers charge anywhere from $39 to $249 a month; the $39 level allows "very few if any" free minutes, with per-minute charges. d'Arbeloff believes the most popular plans will be in the $99 a month range, with a "fairly large number" of free minutes.

As the network product arrives, varying levels of functionality at varying prices likely will be offered as well, Touber says. Pac Bell and AT&T will provide development on creating a Wildfire system with greater capacity, as well as market research on feature offerings, d'Arbeloff adds.

Touber isn't concerned about losing business to the big service providers; on the contrary, he sees Pac Bell and AT&T's decisions as a vote of confidence.

"It just continues to legitimize the whole thing," Touber says. ■

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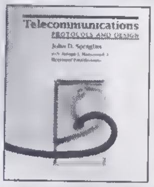

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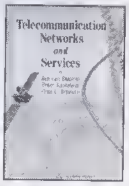

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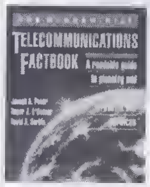

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April 2-3	North Dakota Telephone Association Annual Meeting	Bismarck ND	Radisson Inn	701-223-6022
April 15-17	NTCA Legislative Conference (Regions 1,2,3,6,9)	Washington DC	N/A	202-298-2320
April 17-19	NTCA Legislative Conference (Regions 4,5,7,8,10)	Washington DC	N/A	202-298-2320
May 6-9	Oregon Independent Telephone Association Annual Meeting	Sunriver OR	Sunriver Lodge & Resort	503-581-7430
May 13-16	Tri-State Telephone Operations Conference & Showcase	Fargo ND	Holiday Inn	202-298-2320
May 20-22	Alaska Telephone Association Annual Meeting	Dutch Harbor AK	Grand Aleutian Hotel	907-563-4000
May 20-22	International Conference on Electromagnetic Energy	Washington DC	Washington Vista Hotel	202-452-1070
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▼ Nov. 1-3	ALTS Conference and Exposition	Palm Springs CA	Westin Mission Hills Resort	202-466-2581
Nov. 1-3	UNICOM '95	Washington DC	Convention Center	202-296-9800
Nov. 2-3	ID Info: San Jose	San Jose CA	Le Baron Hotel	800-331-5706
Nov. 2-3	Fifth Annual North American Telecom Investment Opportunities Conference	Pebble Beach CA	Lodge at Pebble Beach	800-255-2099
Nov. 5-7	Cooperative Strategies and Solutions: Building a National Info-Structure	Alexandria VA	Radisson Mark Plaza Hotel	800-669-4826
▼ Nov. 5-8	USTA National Conference	Orlando FL	Marriott/Hilton	202-326-7279
Nov. 6-8	Iowa Telephone Association	Des Moines IA	Crystal Inn	202-298-2328
Nov. 6-9	Next Generation Networks Annual Conference	Washington DC	Crystal Gateway Marriott	800-227-1234
Nov. 7-9	Wireless World Expo '95	San Francisco CA	Moscone Center	
Nov. 8-9	North Dakota Telephone Association Fall Conference	Minot ND	Sheraton Riverside Inn	202-298-2328
Nov. 8-10	Interactive Entertainment	Washington DC	Sheraton Carlton	800-822-6338
Nov. 11-13	NIUF (ISDN) Fall Meeting	Gaithersburg MD	National Institute of Standards & Technology	301-975-2937
Nov. 12-15	American Telemarketing Association Convention	Hilton Head SC	Hyatt Regency	213-463-2330
Nov. 13-16	CMA Telecom	New York NY	New York Hilton and Towers	800-262-3976
Nov. 13-16	44th International Wire & Cable Symposium	Philadelphia PA	Philadelphia Marriott	908-389-0990
Nov. 13-17	COMDEX Fall '95	Las Vegas NV	Convention Center	617-449-6600
Nov. 13-16	NARUC Annual Convention	New Orleans LA	N/A	202-898-2200
Nov. 14-15	Bar Code Solutions and Strategies Seminar	Dallas TX	Arlington Hilton	800-733-7592
Nov. 16-17	Video Dialtone Summit	Washington DC	ANA Hotel	202-408-0008
Nov. 28-30	Wireless '95 America	Miami FL	N/A	202-429-2031
Nov. 29-30	Survival in Telecommunications Management	New York NY	Hotel Macklowe	800-227-1234
Nov. 29-Dec. 1	Western Cable Show	Anaheim CA	Anaheim Convention Center	510-428-2225
Dec. 4-6	Implementing Local Exchange Competition	Washington DC	Marriott Metro Center	800-822-6338
Dec. 4-6	North Dakota Association of Telephone Cooperatives Annual Meeting	Bismarck ND	Radisson Inn	202-298-2328
Dec. 4-8	SUPERCOMPUTING '95	San Diego CA	Convention Center	619-534-5039
Dec. 6-8	Multimedia ComForum and TecForums	Bal Harbour FL	Sheraton Bal Harbour	312-938-3500
Dec. 12-13	Bar Code Solutions and Strategies Seminar	Chicago IL	Ramada O'Hare	800-733-7592
Jan. 5-8	Consumer Electronics Show	Las Vegas NV	N/A	202-457-8700
Jan. 8-10	SCTE Conference on Emerging Technologies	San Francisco CA	N/A	610-363-6888
Jan. 11-12	NECA Board Meeting	Orlando FL	N/A	202-298-2328
Jan. 14-18	18th Annual Pacific Telecommunications Conference	Honolulu HI	Sheraton Waikiki	808-941-3789
Jan. 15-18	BICSI Winter Conference	Orlando FL	N/A	800-242-7405
Jan. 16-18	COMDEX/PacRim	Vancouver BC	N/A	617-449-6600
Jan. 22-26	Alaska Telephone Association Winter Conference	Maui HI	Westin Maui	202-298-2328
Jan. 22-27	OPASTCO Winter Convention	Marco Island FL	Marriott Hotel	202-298-2328
Jan. 24-26	AFCEA Western Conference	San Diego CA	N/A	703-631-6200
Jan. 24-26	MexCom '96	Mexico City, Mexico	N/A	305-670-9444
Jan. 29-Feb. 1	Communications Network '96	Washington DC	N/A	617-769-8950
Jan. 30-Feb. 1	Telecom Resellers Association Conference	Huntington Beach CA	N/A	703-734-1225
Feb. 4-8	NTCA Annual Meeting & Expo	New Orleans LA	Marriott	202-298-2320
Feb. 14-16	Louisiana Telephone Association Annual Convention	New Orleans LA	N/A	504-927-1377
March 17-20	Western Rural Telephone Association Annual Meeting	Monterey CA	N/A	707-578-5580
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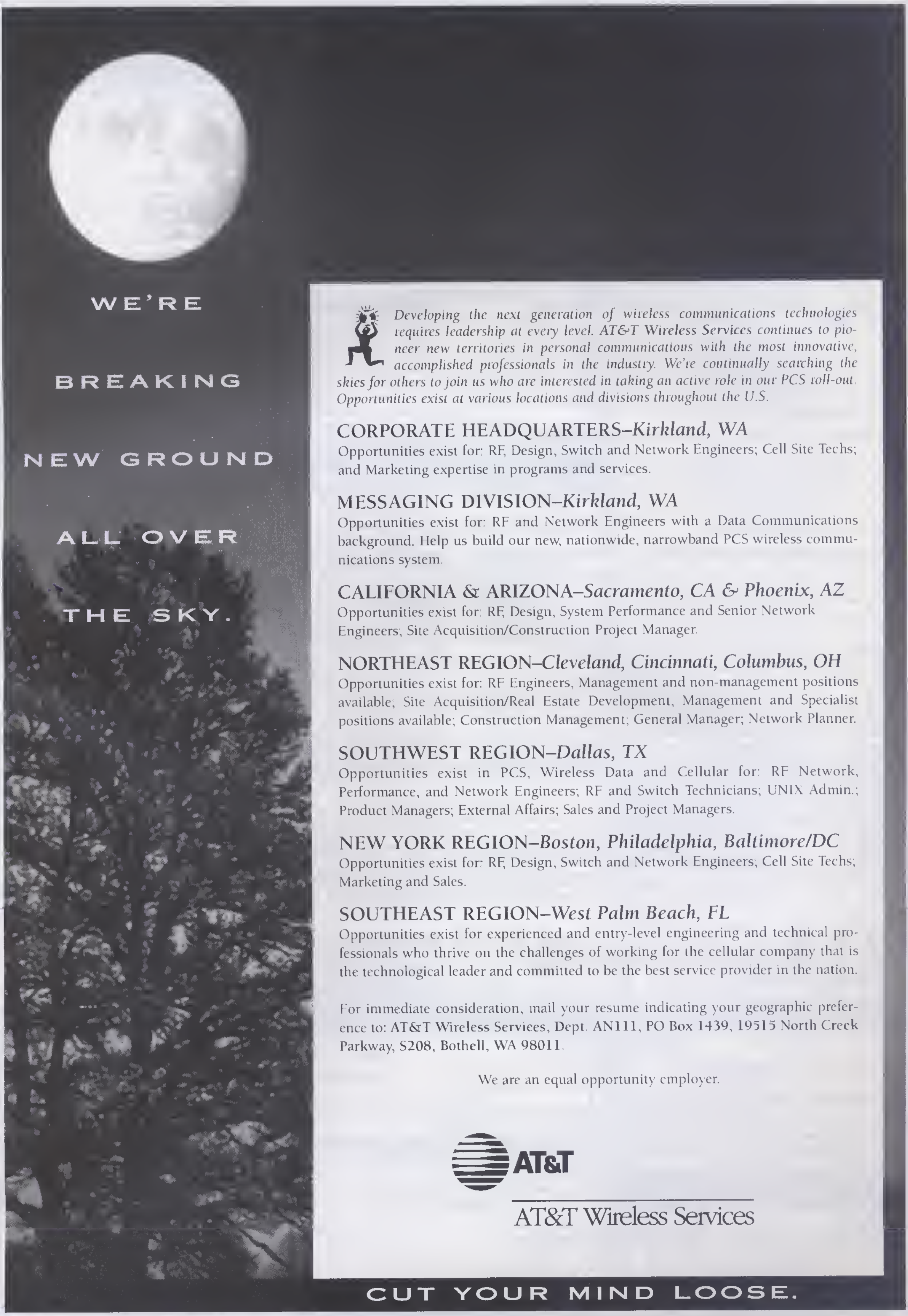

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GENERAL MANAGER, TECHNOLOGY NETWORK AND SERVICE DEVELOPMENT

Lead the team responsible for network planning and development, technology network rollout and service development support. You must have a strong marketing and customer orientation, project management expertise, an engineering degree preferably combined with an MBA and at least 12 years' experience in technical management with a telecommunications carrier.

GENERAL MANAGER, TECHNICAL OPERATIONS

The smooth and efficient operation of the network will be your responsibility. You must meet and exceed customer expectations. You are a strong leader/manager and your technical knowledge and engineering skills are complemented by general business acumen and possibly an MBA. Your impressive record in operations management spans at least 12 years with a telecommunications carrier.

GENERAL MANAGER, CORPORATE COMMUNICATIONS

Lead and manage the team responsible for all corporate marketing activities including corporate branding/public relations, advertising, internal communications and market/industry research. You must have a minimum of 10 years' experience in marketing management in a multi-divisional telecommunications company and a university degree, preferably an MBA.

GENERAL MANAGER, CUSTOMER SERVICE AND CALL MANAGEMENT CENTRE

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GENERAL MANAGER, INFORMATION TECHNOLOGY

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MANAGER, PRODUCT AND SERVICE DEVELOPMENT

Identify current and future market trends and technology; take charge of the development and rollout of new products and services. Responsibilities include product marketing, strategic planning, pricing and distribution. You must have a minimum of five years' experience in fixed or mobile communications and a degree in Marketing or Communications Engineering.

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WIRELESS LOCAL LOOPS

continued from page ***48***

"There was an item docket last year for two 10MHz chunks being lobbied for by the RBOCs, but it was given to PCS," confirms Rafter. "U S West in particular is having big problems with held orders in areas of the Rocky Mountains."

"Our suspicion is you will see significant fixed wireless capability using the PCS narrowband spectrum," adds Sarbana.

ECONOMICS

Application arguments aside, PCS spectrum costs could limit fixed wireless opportunities—cost savings may not justify business cases. It's unfortunate, because wireless local loop economics appear favorable. "The trade-off is in life cycle versus capital costs, and we'll have an advantage there," claims AT&T's Stanek. "That's the key advantage for wireless local loop in general."

And there's general vendor agreement. "It will prove in for any average-size loop application," says Sarbana. "Prices are dropping for wireline and wireless. But while most of the cost in wireline is in physical aspects and installation, the bulk of the cost in wireless is electronics. They're comparable today, but in time it's likely to beat wireline systems handily."

"As we go around the world, we get figures as low as $300 to $2000 [installing copper]," adds Marsh. "That depends on what's included in that cost, the situation and the operator. But when viewed over the whole life cycle, [wireless local loop] is often if not always competitive."

Yankee Group's Lowenstein hasn't seen price curves come down as much as vendors indicate, but Southwestern Bell's Formhals lends credence to manufacturers' claims. "Based on cost information today, we found that first look it will be a little cheaper up front and in ongoing costs," he contends. "It could be up to 10% less in ongoing operations."

Competitive in price, secure and service transparent, wireless local loops should have a promising U.S. future. They may not mirror international implementations, but wireless local loops may appear in your neighborhood—soon. ■

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GOING ABOVE AND BEYOND THE CALL—IN UTAH AND ALASKA

Art Brothers, Contributing Editor

MCI doesn't like my Beehive Telephone Co.'s FCC access tariffs. So after eight months of not paying and my reminding them they were also being charged slightly over 10% per month late fees compounded daily (thanks NECA), they filed a complaint with the FCC. Said they didn't like Beehive's tariffs. Gee.

On Sept 29, after reading a bunch of MCI lawsuits against little folks, we pretty much used their language and filed suit for the million (plus legal fees and costs) we contend MCI owes Beehive. Judge Winder in the U.S. District Court in Salt Lake City got the draw.

Now about AT&T...

Etched in Stone

Venturing where others dared not, with a vision beyond convention and the will to persist, he brought 21st century telecommunication to regions of rural Utah.

NARTE

So there stands U.S. Sen. Robert Bennett. He's in his Salt Lake City office—not one piece of paper visible. I asked him how he does it. The reply was that the desk has big drawers and he can just shove everything out of sight. I don't believe it. Bob is one of the most efficient and organized guys I've ever met.

The Senator is making this award on behalf of the National Association of Radio and Telecommunications Engineers. Every year, this group selects someone to receive its National Service Award. I was invited. It is a nice award—a white marble-type plaque just over a foot tall, 10 inches wide and an inch thick.

The letter says that the 1994 recipient has the fun of presenting the NARTE $1000 scholarship award to a university of his/her choice. The engraving reads:

Who through extraordinary determination and innovation, made an impossible dream a reality. Venturing where others dared not, with a vision beyond convention and the will to persist, he brought 21st century telecommunication to regions of rural Utah.

I thank Ray Thrower and the rest of the Board. And Ray, I gave the money to the University of Utah in Salt Lake City.

ABOVE AND BEYOND THE CALL

We hired a Colonel out of the Russian Army. Sasha picked up his departure ticket at the Alaska Airlines terminal in Khabarovsk. Then the day before leaving, we learned the flight would be a day late. That put the kibosh on his transfer from Alaska to Delta in Seattle. Delta's Seattle (SEA) to Salt Lake City (SLC) flight had no seats that next day.

It is helpful to know that Alaska runs a weekly flight from Anchorage to Khabarovsk and on to Irkutsk where it stays overnight. The next day it comes back. The Russians won't allow competition within Russia for foreign airlines. They only can drop off and pick up international passengers and freight. Alaska also goes to Vladivostok and Petropavlovsk (this last where everyone shoots pictures—the place is like a static airshow because of the astounding variety of aircraft based there).

Anyhow, before leaving Anchorage, one of the two radios Alaska mandates be operational for its international flights died. It took a day to replace. So Alaska phoned me to advise. The agent in Russia did not phone Sasha, but I did. No problem, except for the Delta connection—its next-day flight had no seats! Alaska solved the problem.

Bruce LaLonde, the Anchorage terminal manager, said that because he already had Sasha's Delta tickets from SEA to SLC (that's another story), he would arrange for Sasha to take the Delta direct flight from Anchorage to SLC.

FROM RUSSIA WITH LOVE

When the Alaska flight from Russia landed at 11:40 p.m., Bruce had his international lady meet Sasha at the plane door. Holly took Sasha to immigration and customs—both had been alerted. They processed him in 10 minutes! Because Sasha now had his Delta tickets, he could check his bags direct to Delta, then take the bus ride to the domestic terminal to get on the plane. Alaska then got him on the Salt Lake Delta flight.

Bruce called me 12:40 a.m. his time to say Sasha was OK and waiting to board. Bruce allowed he "just happened to be down at the terminal." Sure. But his wife told me Bruce went down special to make sure Sasha got through OK.

Sure enough, when the flight arrived in Salt Lake at 7:30 a.m., Sasha came out with a big American-type smile. I will admit we spent a lot of time on the phone making sure there were no problems, but I've never, ever seen anybody turn out for customers like Alaska Airlines' Bruce LaLonde did. Thanks Bruce. ■

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